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An Index to the Seventieth Volume of THE RAILWAY GAZETTE, covering the issues from January 6 to June 30, 1939, is presented as a Supplement to every copy of this week's issue

DIESEL RAILWAY TRACTION

A Supplement illustrating and describing developments in Diesel Railway Traction is presented with every copy of this week's issue

Permanent Way Men at Hull

ANOTHER summer convention of that useful body, the Permanent Way Institution, has just been held, this time at Hull. Apart from the visits paid by members to some of the numerous factories in the neighbourhood and to a striking demonstration of relaying with the aid of mechanical appliances, this convention, like its predecessors, brought into direct social contact men of all grades in the permanent way departments "from chief engineers upwards," to quote Mr. W. K. Wallace, Chief Civil Engineer of the L.M.S.R. Members came to Hull from every main-line railway in Great Britain and Ireland, from the London Passenger Transport Board, and from India, so the opportunities of mutual discussion of common problems, from both the theoretical and the practical standpoints were numerous. We were party to an animated and perfectly frank discussion in which a chief engineer, a permanent way inspector, a ganger, and others argued a knotty point, doubtless with ultimately beneficial effect on the railways and those who travel on them. One feature of the Hull Convention significant of the friendliness that remains inherent between individuals

who have common human interests was the warmth with which a resolution was carried to send greetings to the German railwaymen who had so hospitably entertained members of the institution on their convention at Cologne last summer.

* * * *

The Manchester & Leeds Railway

The centenary occurred on Tuesday last, July 4, of the public opening of the first section of the Manchester & Leeds Railway, later part of the Lancashire & Yorkshire Railway and now included in the L.M.S.R. Proposals for a railway between Manchester and Leeds were mooted as early as 1825. Eventually the company was incorporated in 1836; the route was surveyed, and the line constructed, by George Stephenson, who regarded the Summit tunnel, between Littleborough and Walsden, as the greatest piece of railway engineering he had yet achieved. This tunnel is 2,885 yd. long and is the eighth longest on the L.M.S.R. system; it cost over £250,000, employed 1,000 men for nearly four years, and included 23 million bricks and 8,000 tons of cement. At its deepest point the tunnel is 300 ft. below the Pennines. It was owing to the Summit tunnel being unfinished that the line could not be opened farther than from Manchester to Littleborough, 14 miles, on July 4, 1839. At first the unusual gauge of 4 ft. 9 in. was used. Originally there were only eight trains a day in each direction, whereas at present about 150 trains pass through Littleborough on a normal day, and about 200 in the holiday season.

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The Week's Traffics

Traffics of the four main-line companies for the past week are noteworthy in that they bring increases in the aggregate figures for the 26 weeks of 1939 to each company in comparison with the corresponding period in 1938.

	26th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R.	+ 3,000	+ 82,000	+ 22,000	+ 107,000	+ 110,000	+0.35
L.N.E.R.	+ 8,000	+ 46,000	+ 39,000	+ 77,000	+ 7,000	+0.03
G.W.R.	+ 4,000	+ 39,000	+ 11,000	+ 46,000	+ 309,000	+2.40
S.R.	+ 3,000	+ 10,000	+ 5,000	+ 18,000	+ 57,000	+0.56

The extent to which the 1939 traffics are still below those of 1937 is shown in the following table:—

	26th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R.	+ 17,000	+ 8,000	+ 11,000	+ 36,000	- 595,000	-1.37
L.N.E.R.	- 27,000	- 13,000	+ 11,000	- 29,000	- 549,000	-2.35
G.W.R.	+ 12,000	+ 15,000	+ 2,000	+ 5,000	+ 1,000	+0.008
S.R.	- 6,000	+ 7,500	+ 5,500	+ 7,000	- 2,000	-0.02

Passenger train traffics and merchandise earnings to date in 1939 are down respectively £323,000 and £1,108,000 in comparison with 1937, but coal class receipts are £286,000 up.

* * * *

Paris Metropolitan Railway

Traffic in 1938 on the inner sections of the Paris Metro. fell off in comparison with 1937 in which year receipts had increased sharply because of the International Exhibition. On the suburban extensions, however, increases were shown. Urban line passengers in 1938 were 541,938,127, against 625,162,962 in 1937, but on the suburban lines the number of passengers rose from 41,969,392 in 1937 to 50,891,019 in 1938. Passenger receipts in 1938 amounted to fr. 723,526,660 against fr. 612,434,126 in 1937, and operating expenses in 1938 were fr. 608,407,914, leaving an operating profit of fr. 115,118,646. Net income for 1938 amounted to fr. 28,278,098 compared with fr. 28,338,941 in 1937, and the dividend is maintained at fr. 60 on the ordinary shares and fr. 52.50 on the jouissance shares. Including the Sceaux electrified

line taken over from the former Paris—Orleans Company, the length of line now operated by the Metro. is 110 miles. Traffic on the Sceaux line has greatly increased since the inauguration of electric services as from January 18, 1938, and produced passenger receipts in 1938 of fr. 20,781,060. Although showing a deficit of fr. 38,394,393 in 1938, it is expected to produce a profit in the near future.

* * * *

Newfoundland Railways in 1937-38

The Newfoundland Railway administration operates a railway which traverses Newfoundland from St. John's on the east to Port aux Basques on the west, and a fleet of steamers and a dry dock. As a result of the general improvement in business conditions in Newfoundland in 1937, receipts from both goods and passengers were higher in the year 1937-38 than in 1936-37. Expenses also advanced, partly because of general increases in salaries and wages. The financial position of the combined undertaking is compared in the accompanying table:—

	1936-37	1937-38
Railway and steamer passengers ..	198,700	228,389
Railway and steamer freight, tons ..	520,400	662,479
Railway operating revenues ..	\$1,909,431	\$2,183,601
Railway operating profit ..	\$76,607	\$10,067
Steamship operating profit ..	\$21,867	\$47,311
Dockyard operations profit ..	\$21,000	\$28,910

After providing for pensions and interest and sinking fund advances from the Colonial Development Fund there was a net loss on the combined operations of \$73,570 in 1937-38 as against a net profit of \$32,834 in 1936-37.

* * * *

Mexican Railway Results

Gross receipts of the Mexican Railway Company for the second half of 1938 showed a diminution of 674,797 pesos or 8.7 per cent. compared with the second six months of 1937, although there was some improvement in the earnings from second class passengers and from express and luggage. Working expenses for the half year were lower by only 69,780 pesos or 0.90 per cent. At the standard rate of 18 pesos to the £ the deficiency for the half year is £118,016, which increases the total debit to £1,092,026. Some figures for the complete years 1937 and 1938 are compared herewith:—

	1937 Pesos	1938 Pesos
Passenger receipts	3,894,278	3,821,151
Goods receipts	11,501,556	10,660,172
Gross receipts	15,822,222	14,952,731
Working expenses	15,399,239	15,675,314
Net receipts	422,983	Dr. 722,583

The conditions caused by rising costs of essential services, additional taxation, and labour demands have tended to become worse in spite of the efforts of the management to curtail working expenditure.

* * * *

American Railways Safer than Ever

The American railways are to be congratulated on their enviable record of safety in 1938, the best year in their history. The following table shows some of the percentage figures as compared with other years:—

	Percentages		
	1929	1937	1938
Number of train accidents ..	300	150	100
Employee fatalities ..	146.2	115.6	100
Employee injuries ..	203.5	121.4	100

In level-crossing accidents fewer persons were killed in 1938 than in any other year (except 1933) since 1915; 358 fewer lost their lives in 1938 than in 1937, and 1,118 fewer were injured in such accidents. The statisticians assert that passengers are 14 times safer in a train in the U.S.A.

than in a bus, 32 times safer than in a regular air liner, and 544 times safer than in a passenger aeroplane of any type. There were three times as many train accidents in 1923 as in 1938, and passenger casualties were nearly 3 times as numerous. Trespassers accounted for 51 per cent. of the fatalities in 1938. Great satisfaction prevails at the reduction of fatalities under the age of 21, as pointing to the success of the safety-first campaign in schools.

* * * *

Protection for Platelayers

Accidents involving death or injury to men working on the line are fortunately infrequent, but they do occasionally occur, notwithstanding the regulations in force and the special precautions taken to prevent them. Such accidents are always a matter of concern to responsible railway officers in all countries, and considerable inquiry has been directed to ensuring safety. Records show that most accidents of this description have occurred on sections of multiple track and have been attributable to visibility being obscured by steam or smoke at a time when one train is overtaking another on an adjoining track. What is required therefore is some device which will act unfailingly regardless of noise and visibility, and, incidentally, eliminate the human element. We dealt at some length with this question in our issue of August 27, 1937, at page 349, and again in that of May 27, 1938, at page 1006, when we suggested that some form of short-wave wireless might meet the case. It is therefore satisfactory to report that an apparatus has been devised, and is in use on a French railway, which seems to meet the requirements in the form we indicated. This new device is described and illustrated on page 23 of the present issue.

* * * *

Excessive Speed After Warning

Colonel Woodhouse's report (page 31) on the accident on January 26 at Hatfield places responsibility on the colliding driver who, although warned that all communication was interrupted, must have been travelling through the block section at something like 40 m.p.h., as is proved by the damage done and the way in which trains in front were driven forward. When permissive working of any sort is in operation safety must rest primarily on drivers exercising the ordinary vigilance dictated by common sense, which they might be expected to do for their own sakes. The advisability of providing some supplementary protection in clear weather, at least at certain places where trains may accumulate outside signals, is recommended for consideration. Block Telegraph Regulation 25 contains some words, the precise bearing of which does not appear too clear, but the signalman was considered by his officers to have acted in accordance with their understanding of the rule. Serious as is the inconvenience caused by the collapse of overhead line wires, their replacement by cables would generally be far too costly for adoption, as most countries have recognised, but the provision of stormproof box-to-box telephone circuits would do much to reduce the nuisance that severe weather can bring, and Colonel Woodhouse invites the railway companies to investigate its possibilities.

* * * *

Signal Sighting in India

Some of the difficulties experienced in sighting signals under the special conditions of intense sunlight and heat met with in India are touched on in an article by Mr. H. C. Towers, Signal Engineer, Metre-Gauge System, B.B. & C.I.R., on page 19 in this issue. Notwithstanding the strong light in the daytime, the colour-light signal has given satisfaction in that country, although, as Mr. Towers

points out, there are certain locations in which the time-honoured semaphore gives better visibility, and others where neither type of signal can be said to be entirely satisfactory. He emphasises the difficulty of sighting semaphores where overhead contact wires are used and the advantages offered by the light signal in such circumstances. In this country, when the former Brighton line adopted single-phase traction, it was greatly feared that the overhead structures would make signal sighting extremely difficult, but although some nuisance did arise, it was found to be very much less than had been expected. The struts on all the structures, except those on the South London line, were arranged so that a signal arm when "off" was always seen sloping across them. Other countries, such as Switzerland and Sweden, are now finding light signals a great convenience where overhead wires are used.

* * * *

A Famous Locomotive Class

A remarkable feature of Pennsylvania passenger train operation is that, over non-electrified sections of its main lines, reliance is still placed, even for the fastest services, on the "K-4s" Pacifics—a design first introduced in May, 1914, and now 25 years old. Straightforward and well-proportioned, the "K-4s" Pacifics, though still not provided with boosters, feedwater heaters, thermic syphons, and other details now generally included as part of the equipment of modern American locomotives, continue to give a good account of themselves. Recent improvements in superheaters, firegrates and blast arrangements have increased the maximum horsepower of the engines so altered by 5 per cent. As compared with many much larger American express locomotive types, the "K-4s" Pacifics have 27 in. \times 28 in. cylinders, 6 ft. 8 in. driving wheels, 205 lb. pressure, 44,460 lb. tractive force, and a weight in working order, without tender, of 143 tons. The first engine of the series was on trial for three years before building began in earnest, and the series of 425 engines of this type was completed in 1928. One has been experimentally streamlined for service on the Broadway Limited. A "K-4s" Pacific figured in the recent high-speed train resistance tests with a 1,000-ton train, in competition with a C. & N.W. 4-6-4 and a 4-8-4 of the U.P., and made some notable running. But it has been customary to use these Pacifics in pairs on the heaviest normal duties, and it is to provide equivalent power in a single unit that the new and revolutionary 6-4-4-6 Pennsylvania design, now on show at the New York World's Fair, has been evolved.

* * * *

Welding Worn Tyres

Instruction sheets adopted for use in repair shops of the German State Railway define clearly the conditions under which worn tyres may be built-up by welding. Broadly, the building-up of worn tyres by welding is permitted on goods locomotives for speeds up to 50 km.p.h. (31 m.p.h.) and with reservations for speeds up to 75 km.p.h. (46.6 m.p.h.), also on tenders of passenger locomotives. The practice is permitted only on certain defined types of steel and not on tyres of unknown material. The thickness of the worn tyre on the running circle must be not less than 45 mm. (1 $\frac{3}{4}$ in.). Special importance is attached to the preheating of the tyres and to their slow cooling after welding. The worn tyre is given a light cut in the lathe before welding, thus providing useful indication to the welder of the amount of material required at each point and helping to avoid waste. An automatic welding machine is used, with a carrier enabling the wheel-set to be rotated in the vertical plane of the axle. The weld

metal is applied in the form of continuous circumferential strips, the position of consecutive strips being stipulated, according to the extent of wear, so that a minimum amount of deposited metal has to be removed in finishing the restored profile. Grinding begins after applying the first strip, at a point about 90 deg. away from the start of the weld. The finished repair is inspected by a lens of at least four diameters magnification and any suspected spots are tested for cracks by the magnetic powder method. Finally, road trials over distances of 120-150 km. (75 miles) are made under stated conditions. Subject to all the provisions of the instructions, tyres may be rebuilt three times by welding.

* * * *

Coning Locomotive Wheel Tyres

Coning locomotive wheels has been practised for at least 110 years, and therefore dates back to the earliest days of steam-operated railways. The coning of wagon wheels seems to have been introduced in pre-steam days, and probably was a direct result of the introduction of iron rails in substitution for the old wooden rails on colliery lines. So far as locomotives are concerned, we have the evidence of Nicholas Wood in his well-known "Practical Treatise on Rail-Roads" that up to 1826 the common form of the locomotive wheel was cylindrical. The introduction of public steam-operated railways, however, with the opening of the Stockton & Darlington Railway, gives us early details of coning. These are contained in a comprehensive report by two Prussian mining engineers, von Dechen and von Oeynhausen, who made an exhaustive study of the railways of England and visited Newcastle-on-Tyne in 1827. On their return to Germany they published an account entitled "Railways in England: Observations made during a journey in the years 1826 and 1827" (Archiv für Bergbau und Hüttenwesen, Vol. XIX, Berlin, 1829) which includes probably the most complete description of the locomotives of the Stockton & Darlington Railway in use in 1827. These Prussian engineers described the locomotive wheels in detail, and said that the form of construction, adopted after many trials, included in new wheels a conical tread 4 $\frac{1}{2}$ in. wide diminishing towards the front $\frac{1}{8}$ in.—in other words a 1 in 25 coning. Von Gerstner, in his famous three-volume "Handbuch der Mechanik," published in Prague in 1831, illustrates in detail a flanged railway wagon-wheel with 1 in 12 coning.

* * * *

History-Makers, Then and Now

The July issue of *Bradshaw's International Air Guide* for the first time in its history gives the schedules of regular flying-boat services across the Atlantic. On the northern route between Newfoundland and Eire mails only are being carried at present, but the air line between Port Washington and Marseilles *via* the Azores and Portugal shows a passenger departure in each direction once a week. Flying is not the object of incredulity the railways were on their first appearance, and it is too far from the ordinary man's pocket to arouse the feelings of pride or envy that are stimulated by railway improvements. It is hard luck for future historians of air transport that they will not find the human interest provided by the lavish celebrations of the early railway days. An unobtrusive paragraph in a daily paper told us merely that passengers on the first direct transatlantic service seemed loth to retire to bed on reaching London. Participants in early milestones of railway history would hardly have considered bed as a matter of choice, but would have felt they had failed in their duty if they did not have to be carried there.

Railway Wages

ONCE again the thorny problem of railway wages compels attention. The publication, on June 29, of the Decision (No. 1,732) of the Industrial Court on the claims of the trade unions affecting railway shopmen, was followed the next day by a joint meeting in London between the railway trade unions and the General Managers to discuss certain claims, including that of the N.U.R. for the establishment of a minimum rate of fifty shillings a week for all male adults in conciliation grades. Two days later there was held at Clacton a demonstration, organised by the N.U.R., preparatory to its annual general meeting which began on Monday last, and Mr. Marchbank, the union's General Secretary, spoke on the wages question. The Industrial Court, by Decision No. 1,732, has rejected completely the five claims submitted, namely, an increase by 2d. an hour of all standard time rates of pay; the establishment of a 50s. minimum standard time rate and war wage combined; the conceding of (a) a guaranteed day; and (b) a guaranteed week; and the doubling of the existing paid holidays. The companies had contended during the hearing on June 15 that "no additional burden to the already excessive labour cost can possibly be justified," and the Court was evidently convinced of the truth of this submission, although not specifically stating this in its award. Concerning the claim for increased wages the Court bluntly stated that it "has not been established, and so decide."

As regards the proposal for a 50s. minimum, the Court observes that "the concession of this claim would involve a departure from the basis upon which proceed the various rates provided for in award No. 728" (which determined the rates and conditions of shopmen in 1922). Piece-work prices would be affected and "would render inevitable a review of the rates of wages of other classes of workpeople whose rates of wages had been fixed in relation to those affected by the present claim." The Court takes the view that "whatever ground there may be for some adjustment in the level of wages of those at the lower end of the scale, the claim is not one which should be conceded, either at the present time, or in its present form." The remaining three claims are briefly dismissed, and so yet another independent tribunal has reached the conclusion that no substantial changes are warranted in the wages and conditions of the section of staff over which it has jurisdiction. The result of this appeal to the Industrial Court, has, as did the appeals earlier in the year to the Railway Staff National Tribunal, caused keen disappointment to the membership of the unions, and in particular to the N.U.R. The attitude of this union was expressed by Mr. Marchbank on Sunday when he declared that they could not accept the argument that the financial position of the companies made it impossible to concede the claim. He uttered a "warning" that there will be "no peace in the railway service" until the demand for a minimum wage of 50s. a week had been met. That the union is keenly determined to secure this improvement cannot be doubted, but that is perhaps only natural.

It is not, however, without significance that, within the space of six months, both the Railway Staff National Tribunal and the Industrial Court have independently investigated the case submitted by the union for conceding the claim, and each body has found that the time is not opportune to make so fundamental a change and one which would inevitably produce such repercussions on wages generally. If the claim were conceded, as asked for, no fewer than 114 workshop grades, placed by Award No. 728 on a number of different levels with appropriate differentials, would be brought on to one and the same level and this would be unjust to workmen of differing

degrees of skill and responsibility. In the case of conciliation grades, no fewer than 110 grades, covering 122,000 men, or nearly 40 per cent. of the conciliation staff, which in the past have been variously rated, would all be on the same rate of pay. This would be "standardisation run riot" and it is obvious that the proposal could not be adopted without involving consequential increases for other staff, and so the cost becomes prohibitive. In its Decision No. 5, the Tribunal recognised how great this cost would be, but indicated that "a strong case has been presented for making an increase upon the lowest rates a first claim as soon as the financial position makes any substantial concession possible." At the joint meeting held on Friday last, the companies were doubtless reminded of this expression of opinion of the tribunal, but the issue is by no means simple, for it becomes considerably complicated by the re-submission by the A.S.L.E.F. of the *whole* of its claims which were so summarily rejected by the tribunal as recently as February last. Indeed, as we wrote in these columns in our issue of April 21, "the companies may well ask if there is to be no finality." It may perhaps be contended that the financial position of the companies is better than it was a few months ago, but it seems to us that a very marked improvement, not only in receipts, but in prospects, must precede any increase in labour costs, and while the present state of tension in Europe exists there appears to be no substantial reason for forecasting any important rise in railway revenues.

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The Indian Pacific Locomotive Committee's Report

THE report of the Indian Pacific Locomotive Committee, summarised on pages 12-16, is remarkable primarily for its volume, the authoritative opinions it embodies, its wealth of detail, and the exhaustive inquiry it records. The ground covered includes not only locomotive design, purchase in bulk, and performance, but also types and maintenance of permanent way, and many complementary matters. British, French, German, and Indian practice are quoted for purposes of comparison, and recommendations are based on the unanimous agreement of mechanical or civil engineering experts from three of these countries and therefore carry great weight. After preliminary discussions in London with representatives of consulting and other engineers, the committee toured India for six weeks during the latter part of the monsoon, enabling its members to note the effects of the rains on permanent way in various parts of that country. Nearly 7,000 miles were covered by rail and nine major broad-gauge systems were included in the itinerary. Some 63 railway officers and four Government inspectors of railways were interviewed at different places, and eight locomotive workshops and seven running sheds were inspected in detail, besides visits to engineering workshops, and the creosoting depot and Walton Training School, both on the N.W.R. Some 3,100 miles were covered on the footplates of various types of locomotive, and at the same time this mileage of track was tested with a Hallade recorder, situated in the same vehicle throughout the tour. Many varieties of permanent way were also inspected by trolley and on foot, and the committee was satisfied that no preparations were made to present conditions either in respect of engines or track in an unduly favourable light.

The work, prior to the tour, of the research staff under the Railway Board's Central Standards Office in investigating the effects on the track of transverse flange thrust, was of great value to the committee, which has

high praise for this work. As, however, experiments had been confined to results of hunting on straight track, the committee recommends that they be extended to tangential thrust on curves also. After return to London, where the report was compiled, the committee held seven further meetings, which were attended by representatives of consulting engineers and locomotive builders. In considering generally the problem of relationship between locomotives and permanent way, the report cites examples of unsatisfactory locomotives on British railways that have hunted or run roughly, and goes into the question of research and track maintenance and its economic aspect as well as springing and control of locomotives. These examples include the Southern Railway "River" (2-6-4) tank engines, the L.M.S.R. (0-6-4) tanks, the L.N.E.R. 4-4-4 type tanks, and also earlier locomotives. The "Rivers" were converted to 2-6-0 tender engines, the 0-6-4s not scrapped were relegated to slow goods workings, and the 4-4-4s were converted to 4-6-2 tank engines. It is surprising, however, that there is no mention of the exhaustive experiments carried out in 1922 on the former L.B. & S.C.R. with a 4-6-4 tank engine which, as originally built had misbehaved somewhat after the manner of the Indian Pacifics, but which, modified, showed the best riding qualities of any heavy express type, tender or tank, on the line. The tests were fully described in the August, 1922, issue of our constituent *The Railway Engineer*. Some surprise may also be expressed at the small attention the report devotes to balancing.

The committee rightly refuses to be drawn into discussion upon responsibility for the Bihta derailment, and considers that "what is to be done now" is of much greater importance. Nevertheless, some reference might be expected to the low-hung tender spring hangers of the Pacifics, which upon derailment are reported to act as rail skid brakes. It was stressed at the time that their sudden braking effect greatly increased the casualty list at Bihta, and might reasonably be expected to do so again in any future derailment from whatever cause, a point arising from—but not peculiar to—the Bihta accident. The decision to order large numbers of Pacific locomotives for India was, the report makes clear, due to the extreme optimism prevalent between 1920 and 1925, accentuated by the Acworth Report of 1920-21 demanding widespread railway improvements, and encouraged by ever-rising traffics and the reasonable expectation of even better times. The engines began to arrive on the eve of the depression when the financial outlook changed completely, and there was no longer a fear that traffic offering could not be carried. Indeed the difficulties of railway administrations in the face of the inconstancy of financial policy has not escaped the committee. The committee traces the history of locomotive standardisation in India dating from 1901, and re-standardisation since 1924, and this leads up to detailed consideration of the Pacifics and their manner of design, ordering, defects, and remedies. In making its recommendations the committee pays tribute to what had already been done in India before the tour to improve the running of the Pacifics. As well as additional modifications, the committee urges extensive further research into conditions arising between the locomotives and various types and conditions of permanent way, with two trial engines of each of the three Pacific classes. The report devotes much space to this line of research in America, Germany, France, South Africa, Great Britain, and India, and forms a convenient summary with drawings of methods employed and results obtained.

The Railway Board comes in for some criticism for placing large orders for standard Pacifics, despite protests from the consulting engineers, before the new type had been thoroughly tried out. It also shares responsibility with

the consulting engineers for failing to appreciate the importance of correct side control. The report emphasises that modification of these engines should not be finally adopted until flange force records with the two trial engines of each class show those forces to be moderate under reasonable conditions. Meantime the speed limit of 45 m.p.h. should be maintained. Vital importance is also attached to research into the reaction of various types of permanent way to these engines, and particularly 88½-lb. rails laid on Denham & Olphert plate sleepers. Incidental recommendations include the fitting of speed indicators to all express and mail engines, and the employment of mechanical inspectors divorced from routine office work. The committee feels that the possible design and construction of broad-gauge locomotives in India is "in keeping with the general policy of encouraging industrial development" in that country; a warning is, however, expressed that only repeat orders for well-tried types should be considered for building in Indian workshops, at any rate in the early stages. Certain proposals are also made with regard to the status and duties of Government inspectors, especially in connection with their ceasing to be under the Railway Board when the India Act of 1935 is applied fully, a change welcomed by the committee.

* * * *

The Netherlands Rhine Railway

AS the present year marks the centenary of opening of the first railway in the Netherlands, considerable attention is being paid in the Dutch press to the line in question, which was the property of the original Holland Iron Railway Company. The centenary celebrations that are being arranged in Utrecht, and the exhibition at Amsterdam may tend, therefore, to divert attention from another interesting and early railway system in the Netherlands which is almost as ancient as the Holland Iron Railway and is of particular interest to British readers inasmuch as it was at one time a British company. Our contemporary *Spoor- en Tramwegen* has, however, taken the opportunity of the jubilee of the steam tram in Holland—another enterprise of the same owners—to devote a considerable portion of a recent issue partly to a historical survey of the railway in question—the Netherlands Rhine Railway—and partly to an account of this steam tramway undertaking. Although the original railway concession in Holland was granted to a private company, proposals were soon made for the State itself to undertake a main line, as had already been done in the neighbouring country of Belgium. This proposal was rejected in 1838 by the Government, whereupon King William I himself ordered the line to be made by the Department of the Interior and personally guaranteed interest on a loan of nine million guilders at 4½ per cent. which was raised for the purpose. The King retained the direction of the undertaking in his own hands. The line from Amsterdam to Utrecht—which was built to the broad gauge of 1.94 m. (approximately 6 ft. 4½ in., the same as the Holland Iron Railway)—was opened between those cities on December 18, 1843. Further broad gauge sections were opened as follows:—

July 17, 1844, Utrecht—Driebergen.
March 15, 1845, Driebergen—Veenendaal.
May 16, 1845, Veenendaal—Arnhem.

Owing to the working resulting in a serious deficit, the Netherlands Rhine Railway Company was formed on July 18, 1845 with a capital of 24 million guilders and took over the rolling stock and working on September 1 of that year; thus the locomotives ordered by the Government came into the company's possession. In 1852 an agreement was come to between the Government and the

company for the conversion of the Amsterdam—Utrecht—Arnhem line from its original broad gauge to the standard gauge of 4 ft. 8½ in. in order to effect a connection at Emmerich with the Prussian railways. The Netherlands Rhine Railway administration quickly decided to proceed with the work, and in view of the considerable difference between the broad and standard gauges was able to carry it out without interruption to traffic. Thus, as a first stage, a standard-gauge track was laid next to the existing broad gauge one between Amsterdam and Utrecht, and the broad gauge rails taken up subsequently and used to lay a standard-gauge line on the Utrecht—Arnhem section, after which the broad-gauge track between these places was converted, thus leaving a single line from Amsterdam to Utrecht and a double line from Utrecht to Arnhem. Subsequent extensions to the system, all, of course, built to the standard gauge, were brought into service as follow:—

May 21, 1855, Utrecht—Gouda.
May 30, 1855, Gouda—Rotterdam.
February 15, 1856, Arnhem—Emmerich.
November 5, 1869, Breukelen—Harmelen.
May 1, 1870, Gouda—The Hague.
October 15, 1878, Leiden—Woerden.

The first six locomotives came from Sharp, Roberts & Company, Manchester, and, like all the company's broad-gauge engines, had single driving wheels; after that Dutch firms provided a number, in some cases built to English patents. The early signalling installations on the line were provided by a then well-known English firm, Stevens & Sons, of Southwark, which employed its usual designs but with the signal arms reversed for right-hand running. Spagnoletti's disc block instruments, still standard on the Great Western Railway, were also used on the Netherlands Rhine Railway, probably the only case of their being seen outside this country. On October 15, 1890, the working of the line passed into the hands of the Company for Working the State Railways and thenceforward formed part of the "S.S." system of lines until their amalgamation with the Holland Company's system in recent years.

* * * * *

Iraq Railways

THE latest report on the Iraq State Railways, which we have recently received from the Director-General, Colonel J. C. Ward, covers the 12 months ended March 31, 1938. A full description of the railways and an outline of their history appeared in THE RAILWAY GAZETTE of May 15, 1936, at page 946. The system at present consists of three main sections:—Maqil (Basra) to Baghdad, 353 miles metre gauge; Baghdad to Kirkuk, 200 miles metre gauge; and Baghdad to Baiji, 132 miles 4 ft. 8½ in. gauge. There are various branches which bring the total mileage up to 752 miles. The north and west stations at Baghdad are connected by a wagon ferry across the Tigris, but the Government has authorised the preliminaries for taking actively in hand during 1939 the work of erecting a permanent railway bridge to take the place of this ferry. An extension is under construction of the standard-gauge line from Baiji to Mosul and thence to Tel Kotchek, the terminus of the Syrian Railways. The section between Mosul and Tel Kotchek has, since the date of the report, been completed and opened for traffic, giving Mosul direct rail communication with the whole of Syria and Turkey in Asia, and so with the European railway system.

Earnings for the period under review were the highest recorded in the history of the railways, notwithstanding that reduced rates for local produce continued in operation throughout the year. The increase of 24,913 dinars in passenger revenue is attributable partly to the increased

number of passengers carried during festivals and partly to greater use being made of the cheap fares offered. On the goods side the increase in imports traffic was mainly due to more shipment of Rafidain Oil Company goods and through cargo ocean and rail arrangements. Also, because of certain reductions in rates introduced during the year, the railways have been able to secure traffic from Baghdad to outstations which previously was passing by road. The accompanying table compares certain operating figures for the past two financial years (the Iraq dinar is nominally equivalent to £1):—

	1936-37	1937-38
Length of line open, km.	1,211	1,211
Passengers	2,083,794	2,293,037
Passenger-kilometres	227,446,608	251,365,959
Revenue-earning goods, tons	692,790	703,604
Goods, ton-kilometres	271,290,066	277,624,723
Train-kilometres	2,599,410	2,695,379
Operating ratio, per cent.	88.57	81.78
	Dinars	Dinars
Coaching receipts	188,351	202,449
Goods receipts	407,554	457,127
Total earnings	606,626	710,920
Working expenditure	537,321	663,587
Appropriation from renewals fund	25,071	—
Net earnings	94,376	47,333

In the total earnings for 1937-38 are included catering receipts from the Mosul rest house and from dining cars. The expenses connected therewith are included in the working expenditure. These items are not shown separately in the figures for 1936-37. Railway operating expenditure in 1937-38 amounted to 581,398 dinars, including 53,000 dinars for renewals, replacements, and betterments. Out of the net earnings of 47,333 dinars, the sum of 37,792 dinars is appropriated to service of loan and the sum of 9,541 dinars is placed to general reserve. An average of 55 metre-gauge locomotives including 4 Sentinels, and of 9 standard-gauge locomotives, was in commission.

* * * * *

Railway Cash-on-Delivery Service

THE "cash-on-delivery" facility has become a well-established practice in commercial life and for the last eleven years the British railway companies have done a steadily increasing business in connection with the conveyance of such consignments. Facilities were first afforded the public for the despatch of small parcels of limited value under this system by the General Post Office in March, 1926. The innovation proved successful but, to meet the demand which quickly arose for the scheme to embrace larger, heavier and more valuable parcels, the railway companies in April, 1928, reached an arrangement with the Postmaster General whereby the postal "C.O.D." system was extended to apply to packages conveyed by railway, the companies making a small charge in addition to the appropriate carriage charges and the Post Office fees. Because of the dual control of the railway companies and the Post Office, the procedure was necessarily somewhat complicated and this factor, combined with that of additional cost, resulted in a limited use of the facility.

In July, 1934, therefore, the railway companies brought their own simplified "C.O.D." scheme into operation, as an experiment, for traffic by good and passenger train services. No restriction was placed upon the size or weight of the packages, but the value was restricted to £40 a consignment. The arrangement was adopted in respect of traffic between any stations in England, Scotland, and Wales, as well as Jersey and Guernsey, and also to and from certain Continental ports. It applied to all traffic carried under the appropriate standard terms and conditions, with a few exceptions such as wet fish, ice, highly

perishable traffic to or from Continental ports, livestock, and certain dangerous goods. The scheme proved an immediate success, and two months later it was extended to similar traffic conveyed throughout by railway-operated road services. Over 150,000 consignments were dealt with under the arrangement during the first twelve months, and the companies accordingly decided to continue the facility. To meet the requirements of certain traders the limitation of value was extended to £100 as from January 1, 1936, and more valuable consignments can be conveyed by special arrangement. The commission fees payable range from 6d. where the value of the consignment does not exceed 10s. to 2s. for values between £25 and £40, and 5s. for values between £90 and £100.

The scheme is worked in a very simple manner. A special form of address label, coloured yellow, over-printed with an inverted triangle and headed "Railway C.O.D. Service" printed in red, is supplied to the sender for

attachment to each package, two such labels being attached to the truck in the case of a truck load. In addition to the usual consignment note the sender fills in and hands to the railway company a special "C.O.D. Value" contract in which he declares the value of the goods and asks the company to collect the amount from the consignee. A receipt at the bottom of this form is then completed and handed to the sender, and the forwarding station sends a "C.O.D. Value advice form" to the receiving station. When the consignment has been delivered, and the declared value paid by the consignee, this form is returned by the receiving station to the forwarding station, which then arranges payment to the sender. By this means customers can place orders without sending money in advance, while senders can rely that the goods will not be delivered except upon payment of the value. Over 260,000 such consignments are now conveyed annually by the companies.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

"For These Reliefs No Thanks!"

London, S.W.1

July 3

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—That particular feature of train working on summer Saturdays, consisting of relief portions (some of them non-stop) run in advance of many expresses, needs no underlining for those in the know. Regrettably, however, there are several thousand souls who, week-end after week-end, remain out of the know or wilfully refuse to be put thereinto. In spite of carefully printed timetables (in which, to render things easier, S.O. is separated from M. to F.), and innumerable "sign-posts" at the departure points supplemented by verbal instructions (*fortissimo e con brio*), these people steer an undeviating course for the main trains and fill them to more than capacity, while the reliefs, provided incidentally for their comfort and their convenience, go out half or three-quarters empty. No wonder that traffic men, seeing their best-laid schemes "gang aft agley," weep bitter tears.

It has occurred to me that, other publicity methods being patently inadequate, the B.B.C. might render yeoman service in a good cause. Why shouldn't the four main-line companies prepare a 10-minute programme, styled "Holiday Train Hints," and have it broadcast every Thursday (thus giving time for unadvertised alterations or additions to the ensuing Saturday's working to be included) as an adjunct to the evening news bulletins disseminated from National and Regional stations? Even if the resultant curtailment of fat-stock price announcements or excision of an item of two from somebody-or-other's swing band causes pain and distress to many listeners, I feel sure that just as many will be grateful to receive, so effortlessly, concise information regarding their best mode of travel, though one or two may jib at being asked to have their paper and pencils ready to take down the times of relief trains to Edinburgh, Holyhead, Newquay, Bournemouth, or withersoever.

There will, of course, still remain the inexpugnable apathy of sundry "knowalls," who paradoxically know nothing and who will "switch off" incontinently on hearing something for their ultimate good coming over the air, but I still maintain that the scheme is worth trying and that, if law and order succeeds in being established among a goodly proportion of Saturday "exodists" 2, or even 3, weeks before the holiday season ends, it will not have been tried in vain.

Yours truly,
"OBSERVER"

Edgware, Highgate & London Railway

62, Longland Drive, N.20

July 1

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Whilst it is true that the lines from Finsbury Park to Edgware, High Barnet, and Alexandra Palace ultimately became "old Great Northern Railway branches," as they are called in your editorial note on page 1049 of the current issue, their history, in view of pending electrification, is perhaps worthy of placing on record in more detail.

In the early 'sixties the Great Northern Railway Company was projecting a westerly loop line leaving its main line at Seven Sisters Road (later Finsbury Park), passing through Finchley and High Barnet and rejoining the main route at or near Potters Bar. In 1862 there was incorporated the independent Edgware, Highgate & London Railway, covering to some extent the same ground as the proposed G.N.R. loop. After negotiation the Great Northern Railway agreed to drop its own scheme and to take over the E.H. & L. Company, which it accomplished on July 15, 1867, only five weeks before the opening from Seven Sisters Road to Edgware. The Great Northern also absorbed the Watford & Edgware Junction Railway, incorporated in 1864 for the purpose of extending the E.H. & L.R. to Watford, but abandoned these powers in 1870.

The four intermediate stations on the original line were not all then known by their present names; East Finchley was "East End, Finchley," and Finchley Church End was "Finchley & Hendon." Similarly Woodside Park on the High Barnet section was at one time known as "Torrington Park, Woodside." Cranley Gardens on the Alexandra Palace branch was opened about 1902.

The first section of the Alexandra Palace branch, from Highgate (Park Junction) to Muswell Hill, was constructed under powers of the E.H. & L. Company, but the extension to the Palace (also a further extension, never constructed, to Palace Gates, Wood Green, where it would have joined the Great Eastern Railway branch) was the promotion of another small company, the Muswell Hill (later Muswell Hill Palace) Railway. The G.N.R. did not finally absorb this company until 1911.

Suspension of the Alexandra Palace service after the fire of 1873 was confined to the section beyond Muswell Hill. Among the appliances which were rushed from many parts of North London in a vain attempt to quell the great Palace fire were, incidentally, the two Great Northern Railway fire engines from King's Cross.

Yours faithfully,
D. S. BARRIE

PUBLICATIONS RECEIVED

Universal Directory of Railway Officials and Railway Year Book: 1939-40 Edition. London: The Directory Publishing Co. Ltd., 33, Tothill Street, S.W.1. 5½ in. × 8½ in. × 1½ in. 608 pp. Price 20s. net.—The forty-fifth edition of this useful guide to the titles, extents, rolling-stock, and personnel of the world's railway systems, together with details of a host of financial, statistical, and other railway data, follows the now long-accepted standard of arrangement making it both easy of reference to the railway officer, railway supplier, and student, and also of particular value to those requiring to circularise the head and other officers in the railway field. Principal changes in the new edition, apart from the customary heavy and careful annual revisions, include the bringing in of some 30 additional Spanish railway entries and re-arrangements necessitated by recent central and eastern European political changes, in which connection complete new data for Bohemia and Moravia will be noted.

The Stock Exchange Official Year-Book, 1939. London: Thos. Skinner & Co. (Publishers) Ltd., Gresham House, Old Broad Street, E.C.2. 10½ in. × 6½ in. × 4 in. Pages 1-ccxxxv and 1-3645. Price, including postage (British Isles) £3 1s. 6d., (Europe) £3 3s. 9d., (U.S.A. and Canada, duty paid) \$20, (elsewhere) £3 5s. 6d.—In the sixth issue of this Year Book, which incorporates "The Stock Exchange Official Intelligence" and "The Stock Exchange Year-Book" in one compact volume, are included all the well-known features of a publication which is indispensable to the careful investor. It contains particulars of some 9,400 companies and 2,000 Government and municipal loans, representing in all more than 21,000 securities of which approximately 12,400 are quoted or dealt in on the London and Associated Stock Exchanges. Particulars of 95 companies and 27 Government and municipal loans have been added in this issue. Among the new features is a section devoted to securities guaranteed under the Trade Facilities and other Acts. This is on page 19, immediately after the British funds, &c., section. At the beginning of the Iron, Coal and Steel section a synopsis of the Coal Act, 1938, is given. As in previous volumes, the front portion includes lists of members of the London Stock Exchange, the Associated Stock Exchanges, and the Provincial Brokers' Stock Exchange, chapters on Municipal, County, Indian, Dominion & Colonial, and British & Foreign Finance, a review of the year's legal decisions affecting companies, and a table showing the rates per £1 at which currency figures have been converted into sterling figures.

In the main body of the work under

the heading "Public Boards" will be found details of the London Passenger Transport Board and of the Northern Ireland Road Transport Board. Information as to the London Electric Transport Finance Corporation and the Railway Finance Corporation appears under "Financial Trusts, Land, and Property." Working results from 1929 to 1938 inclusive of the four principal British railway companies are given, and also their investments in other transport undertakings. The Indian Railway section contains particulars of the working contracts between the Secretary of State and the principal companies. In the Foreign Railway section the range is very wide, including Belgian, French, and Italian companies, as well as those in South and Central America. Particulars of the Ottoman Railway Holding Company will be found under "Financial Trusts, Land, and Property." British railway interests in associated bus undertakings are set out in the Tramways and Omnibus section. In the supplement (pages 3591-3598) are given particulars of the scheme of arrangement for adjusting the rights of the different classes of stockholders of the Cordoba Central Railway on its purchase by the Government. After the supplement are the usual particulars relating to stamp duties, trustee investments, income tax, &c., maturity dates of certain debenture and other loans, and lists of statutory and chartered companies.

"Royal Mail"; A Centenary History of the Royal Mail Line, 1839-1939. By T. A. Bushell. London: Trade & Travel Publications Limited, 14, Leadenhall Street, E.C.3. 10 in. × 7½ in. × 1 in. 270 pp. Illustrated. Price 10s. 6d. net.—We were reminded last year by the centenary celebrations at Southampton of the long and intimate association of the London & South Western Railway (and later the Southern Railway) with the development of that port. The present year witnesses the centenary of the Royal Mail Line, which from its formation has been a faithful and consistent customer of the port, and the handsome volume now before us tells the story of the activities of the great shipping undertaking which extended the London-Southampton railway to the ends of the earth. The Royal Mail Steam Packet Company was incorporated by Royal Charter on September 26, 1839, and provision was made for raising £1,500,000 capital—a very large sum in those days. The original (1840) mail contract required an annual mileage of 684,816, which was a far greater undertaking than any previously attempted by private enterprise.

The choice of a home port for the Royal Mail fleet naturally excited a great deal of interest. The City of Bristol, with that civic pride for which it has always been famous, informed the

Government that it was the most suitable port in the south of England. Plymouth and Devonport sent a joint deputation to the company, praying that their excellent port be considered, and other towns are known also to have pressed their claims. The company from the first seems to have favoured the safe and commodious anchorage of Southampton and commissioned John Smeaton to examine its suitability. His report ended: "Southampton as a steam boat station is unrivalled in England." The L.S.W.R. was completed between London and Southampton on May 11, 1840 (not 1841, as Mr. Bushell states), and towards the end of 1841 the Royal Mail line started its services.

The story which Mr. Bushell unfolds is by no means one of uninterrupted progress, but it is an inspiring tale and he tells it well. All interested in transport history will welcome such a volume, and railwaymen in particular may be recommended to read the story of a company which from 1847 to 1856 owned Brunel's *Great Western*, and in 1850 assisted the Panama Railroad with a loan of \$125,000, enabling that line to be completed and opened on January 27, 1855.

Steelwork for Basement Air-Raid Shelters.—In the Draft Provisional Code for Air Raid Shelters issued by the Home Office, particulars are given of the Government requirements for basement shelters. We have received from the British Steelwork Association two appropriate designs—a frame type and a wall bearing type—which provide structural steelwork for a wide range in the size of basements. Particulars are given in tabular form on each drawing. Lithographed copies of the drawings are available on application to the association at Steel House, Tothill Street, London, S.W.1.

Cemented Carbide Tools.—For high-speed machining of alloys and synthetic substances, the English Steel Corporation Limited, Vickers Works, Sheffield, has produced a new cemented carbide known as Escaloy. Several different grades are supplied, and their characteristics will be found in a new catalogue just issued by the maker. A range of standard tips is shown, designed to meet most of the requirements of modern machine shops, but specially shaped tips can be made for special purposes. Escaloy is also recommended for covering or tipping machine parts which are susceptible to wear.

"An Achievement in Structural Steelwork."—We have received a copy of a publication issued by the British Steelwork Association entitled "An Achievement in Structural Steelwork" and dealing with the construction of the Glasgow Empire Exhibition. The booklet illustrates the principal buildings of the exhibition and emphasises the speed of erection and the high recovery value of the steelwork. A foreword is contributed by Mr. T. S. Tait, the official Architect to the exhibition.

THE SCRAP HEAP

All Italian trains stopped for one minute as a mark of respect to Count Costanzo Ciano, former Italian Minister of Communications, and father of the Italian Foreign Minister, who was buried at Leghorn.

EXACTITUDE

"For the formula $\frac{S(J-M)}{(S-M)}$ substitute $\frac{S(J-M)}{S-M}$ published with

Finance Department (Central Revenues) notification No. 24-C. Exc., dated June 10, 1939, on page 975 of *The Gazette of India*, Part I, dated June 10, 1939."—From *The Gazette of India* for June 17, 1939.

Recent publication in the columns of *The Locomotive Journal* of details about the establishment of ambulance classes of locomotive enginemen and

firemen, has produced an interesting letter from G.W.R. Engineman J. W. Whittaker, who says that the first class was begun at Bordesley, Birmingham, "on Sunday, July 13, 1884, with 36 enginemen and firemen, and several of our members now hold medallions for having passed their third examination satisfactorily; and in April, 1885, a large class was started at Sattley, composed of M.R. locomotive employees."

A RAILWAY CONUNDRUM

We have received from Mr. S. Treby the photograph reproduced herewith; it represents a notice exhibited by the L.N.E.R. near Whitby Town station, and below an ordinary notice relative to trespassing. As a railway *tabu*, it seems to us unique; we have read in Continental trains of the formidable penalties attaching to those who attempt to smuggle carpets among



A quaint trespass notice

their personal luggage across frontiers, but the precise urge to beat carpets amidst the luxurious jungle that forms the foreground of this picture escapes us entirely. Possibly some reader on the North-East-Coast can furnish enlightenment on the matter.

One Hundred Years Ago

Extracts from the July, 1839, issue of "The Railway Magazine" (afterwards "Herapath's Railway Journal"), the oldest constituent of THE RAILWAY GAZETTE

Birmingham Railway.—We are glad to hear that this company have increased the speed of their trains. The journey of 112½ miles, not 116½ as *The Railway Times* has it, is now to be performed in 5 hours, including stoppages.

Llanelly Railway.—A further portion of 6½ miles was opened June 1.

Aylesbury Railway.—This branch to the Birmingham line from Aylesbury, was opened June 10. Except at the termini, this line is nearly straight, and 7½ miles in length.

Midland Counties Railway: Partial Opening, from Nottingham to Derby.—May 30 was the day appointed for the opening of this great work; the public day was June 4.

Brandling Junction Railway was partially opened by the directors and a large party of friends, June 18; the general opening is to take place in September. The part now opened is between South Shields and Sunderland. The company dined at Monk Wearmouth, and fortunately reached South Shields in time to avoid the drenching which fell on the openers of the Newcastle & North Shields party. The Brandling Junction Railway was first projected by Robt. Wm. Brandling, Esq., of Low Gosforth, whose name it bears. It unites the towns of Gateshead, South Shields, and Sunderland, and derives the second portion of its title from that circumstance. . . . The works were begun at the Felling, in August, 1836, and it is expected that the entire line will be completed and

opened to the public on September 1 in the present year.

Manchester & Leeds Railway: Experimental Trip.—May 31 witnessed the opening of about 16 miles of this railway, that is, from the company's station, St. George's-street, Oldham-road, Manchester, to the summit tunnel, ¾ of a mile beyond Littleborough.

Newcastle & Carlisle Railway.—The triumph of the directors of the Newcastle & Carlisle Railway over all the difficulties with which they have had to contend, was fully consummated May 21, when the line was further opened from Blaydon to the former town, amidst the firing of cannon, the music of an excellent band, and the cheers of the spectators.

Croydon Railway.—This line was opened on June 1. Cards had been issued out to near 200 ladies and gentlemen, including the Lord Mayor, Lady Mayoress, the Archbishop of Canterbury's lady, several M.P.'s, and some of the Select Committee on Railroads of the House, engineers, and friends to the railway system, who kept arriving at the railway station, London-bridge, until about one o'clock, when the first train started. The second went a few minutes after, which stopped at one of the stations on the line for 1½ minutes, and reached Croydon, 10½ miles, including this stoppage, in 31 min. exactly. . . . For 1½ miles from London-bridge, the Croydon trains pass over the Greenwich line, which the Croydon joins by a viaduct. At this junction is an octa-

gonal light-house, with powerful parabolical reflectors, from which signals by coloured lights can be given a long way off to approaching trains, so as to prevent the chance of collision.

Eastern Counties Railway.—Tuesday, June 18, a portion of this line from the temporary terminus at Devonshire-street, Mile-end, to Romford, 10½ miles, was opened by the directors; the Persian Ambassador, and a large party of about 400 to 500 noblemen, members of Parliaments, distinguished scientific men, engineers, and railway gentlemen. The company departed in two long trains, side by side, on the two lines.

York & North Midland Railway.—The opening of a portion of this very important railway, May 29, has excited the greatest interest and delight in Yorkshire. The papers are literally full of it. One of them, the *Yorkshire Gazette*, contains no less than 12 columns of closely-printed matter on this and railways in general, with a miniature map of the part from York to beyond Littleborough, about 14½ miles opened.

South-Western (heretofore Southampton) Railway.—June 10, 12 miles from Southampton to Winchester, and 8 from Winchfield and Hartley-row station to Basingstoke, were opened to the public by the directors, and a select party of friends, leaving only 18 intermediate miles of the whole line to be completed, which are now supplied by coaches. The fares, at present, are 21s. the whole way from London to Southampton, by the first class, and 13s. by the second; but when the line is complete these will be reduced to 18s. and 12s. The line to connect this railway with Portsmouth and Gosport is just commencing.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

SOUTH AFRICA

Sick Fund Investigation

A committee has been appointed to investigate and report upon the working of the S.A.R. & H. Sick Fund. The personnel of the committee is as follows: Mr. G. J. A. Lindenberg, Assistant Chief Mechanical Engineer (Chairman); Dr. F. P. Bester, Chairman, Railway Medical Officers' Group; Messrs. D. H. C. du Plessis, Superintendent (Parliamentary); R. J. O. Armstrong, Superintendent; G. A. Shaw, Chief Clerk, Headquarters; O. G. Theil, Port Superintendent; D. S. Verwoort, Examiner and Repairer (Carriage and Wagon). Following are the full terms of reference.

To investigate and report upon the organisation, control, management, functions, and financial position of the Sick Fund with particular reference to:—

(a) The extent, if any, to which the existing form of control of the fund's activities can be improved.

(b) The financial position of the fund in all its aspects, its capacity to meet the reasonable requirements of its members and the manner in which any inadequacy in this respect can best be remedied.

(c) The appointment, functions and discharge of railway medical officers, including specialists and surgeons, their remuneration, allowances, expenses, transport facilities, and privileges.

(d) The efficiency or otherwise of the existing system of supplying members' requirements through (1) departmental dispensaries, and (2) contracting chemists.

(e) The elimination of any well-founded cause of general discontent which may, on investigation, be found to exist amongst members; and

(f) The relationship between the fund and the health branch of the administration's activities under the control of the railway health officer.

Parking Facilities

The administration has decided that parking facilities at railway stations are to be available to passengers purchasing ordinary or concessionary return, excursion, or season tickets and to holders of free passes, conditional upon the administration not being held responsible for the loss or damage to such motor vehicles, parts, accessories, or contents, nor for loss of life or personal injury to the driver or other occupant of such vehicle. Persons parking a motor vehicle on a site specially set apart for parking who have not previously obtained a ticket will be charged 2s. 6d. for every day or part thereof during which such vehicle is so parked. A parked vehicle must be removed not later than 6 a.m. on the day following that on which the ticket was issued or, in the case of a season ticket, not later than 6 a.m. on

the day following that on which the ticket expires.

INDIA

Closing Unremunerative Lines

A careful scrutiny of the earnings of branch lines upon all railways throughout India has recently been carried out at the instigation of the Railway Board, and, as a result, ten of them have proved to be working at a loss. Seven are in Southern India and worked by the South Indian Railway, and the other three are in the Punjab and worked by the North Western administration. The annual loss on the seven branch lines in Madras amounts to Rs. 2,94,000, and, of those, in the Punjab, the Lyallpur—Jaranwala and Rohtak—Gogana branches show losses of Rs. 68,000 and Rs. 40,000 respectively. The third Punjab line is the Kangra Valley Railway, a hill line which has been responsible for opening up some remarkably fine scenic country in the outer Himalayas. It also serves the Punjab Government hydro-electric works in Mandi State and the hill station of Palampur. The construction of this line was expedited to carry plant for the hydro-electric scheme in the first instance and proved very costly. Improvements in the main road which parallels this railway have been responsible for keen competition, and the result is that a deficit of Rs. 4,70,000 has been incurred annually on the working of the railway.

Both the Madras and the Punjab Governments are strenuously opposing the closing of any of the unremunerative lines—except, possibly, the Kangra Valley Railway—a measure which is being seriously considered by the Railway Board, and the Government of the Punjab has deemed it worth while to guarantee the Kangra Valley line to the tune of Rs. 4,00,000 annually to keep the line open. This guarantee is, however, due to expire in 1941-42 and the question of closing this line is under discussion between the two Governments.

The Government of Madras is stated to be urging the fact that new Motor Vehicle Rules recently introduced should favourably affect the earnings of the railways under consideration, and points out that the position should be re-examined before drastic steps are taken.

CANADA

The C.P.R. Royal Engine

Official reports indicate that No. 2850 the engine which worked the royal train through from Quebec to Vancouver over C.P.R. metals, was found to be in perfect condition on its return to Montreal. No mechanical

trouble of any kind was experienced in the 3,000-mile westward run and the performance was up to expectation in every way; the engine received no special attention on its return. It worked relief and empty trains on the eastward run in ordinary service, and proceeded to Delson, Quebec, to work the royal train once more thence to Sherbrooke.

UNITED STATES

More 21,000-gallon Tenders

The Pennsylvania Railroad has authorised the construction of 25 additional 21,000-gallon locomotive tenders at a total cost of nearly \$750,000. They will be used with the powerful "M-1" type in the through freight service, and will permit the re-assignment and redistribution, on an extensive scale, of existing tenders of modern type among locomotives in the main-line through passenger service. The result will be to improve the handling of trains in both branches of the service throughout a broad territory of the railroad. The 25 new tenders will supplement an equal number of similar description and capacity authorised late last year, the construction of which has nearly been completed. Like the others of this type, the tenders now authorised will be built at the Pennsylvania Railroad Altoona works.

ARGENTINA

Proposed Railway Tariff Advisory Board

At the session of the Argentine Senate held on May 19, a draft Bill for the creation of an advisory board on railway tariffs, submitted to the Chamber by one of its members, was discussed. The sponsor of the Bill explained that it was designed to co-ordinate tariffs and secure the removal of certain anomalous systems in force in various parts of the country, which were relics of ancient times, and, in some cases, unjustly applied. The Bill was passed to the Legislative Committee for study.

C.C.R. Transfer Completed

The formalities in connection with the purchase by the Argentine Government of the Cordoba Central Railway were concluded on May 22, in the form of a Decree issued by the Ministry of Public Works authorising the State Railways administration to take definite possession of the track, rolling stock and other materials belonging to the company. The Decree also provided for full compliance with the terms of the purchase contract, as passed by Congress and promulgated by the Government. These include payment for the stores held in stock by the company, in accordance with Article 3 of the purchase contract; and the fixing of April 30, 1939, as the date of expiry of the agreement

for the working of the line by the Government, entered into on January 28, 1938. The incorporation of the line in the State Railways system will be regarded as dating from May 1, 1939, and the interest and amortisation of the agreed purchase bonds to the value of £8,800,000 in payment will therefore accrue as from that date. The Ministry of Finance was authorised to liquidate the interest at 4 per cent. on the cash payment of £700,000 as from the date mentioned, until the date on which payment of this amount was effected in London [as recorded on page 1014 in our issue of June 23.—Ed. R.G.]

Institute of Transport (Argentine and River Plate Centre)

The opening meeting of the 1939 session of the above centre was held in Buenos Aires on May 26, when a paper on "Ten Years of Argentine Railway Working" by the Chairman, Mr. C. R. S. Harris, M.A., formerly Director-General, B.A.G.S. and B.A.W. Railways, was read and discussed. After explaining that the object of the paper was to discuss the effects on the finances of the four British broad-gauge Argentine railways of the depreciation of the peso, and the loss of traffic caused during the last decade by road competition, the speaker said that the effect of the depreciation of the peso was twofold: it increased the peso cost of imported materials, and at the same time—and this was still more important—it diminished the sterling value of the net receipts. Depreciation of peso exchange, Mr. Harris said, set in on a serious scale about 1930, and in 1935 the Argentine Government decided to link the peso to the pound by a new system, involving a differential between the Government buying rate and the official rate at which remittances were made. From 1935 to 1938 the percentage of exchange loss to net receipts was in the neighbourhood of 45 to 47 per cent., with the exception of 1936-37, when, owing to special conditions, the depreciation amounted only to 37 per cent.

Dual Effects of Road Competition

Mr. Harris stated that the effects of road competition had also been twofold: (a) loss in the volume of traffic, both passengers and goods, and (b) diminution in receipts per ton and per ton-km. earned by the railways. As regards the former, the volume of traffic diminished considerably up to 1933-34, after which tonnage began once more to increase, and the tonnage carried reached a record figure in 1936-37. On the whole, the volume of goods carried, the speaker said, was not very far below the tonnage transported in the three pre-crisis years, and in 1936-37 it was actually higher; but the receipts per ton had shown a very appreciable diminution amounting to about 12.3 per cent., and in the following year, in which grain tonnage was ab-

normally low, to nearly 18 per cent. The effect of road competition on passenger traffic had been somewhat similar. On the whole, losses had been greatest on short-distance traffic, and the total number of passengers was still below the peak figure attained in 1929-30. Meanwhile there had been a steady decline in the receipts per passenger between 1929-30 and 1937-38 amounting to about 16 per cent.

Joint Surplus of Four Major Lines Falls by 75 per cent.

Mr. Harris then said that the combined effect of exchange depreciation and road competition might be judged by the final sterling results of railway depreciation in 1928-29, when the joint surplus of the four broad-gauge railways amounted to just short of \$186,000,000 paper, which, converted at the par rate of \$11.45, yielded about £16,000,000. In 1936-37 the real surplus on railway working was only \$116,000,000, which, converted at the rate of \$16, is equivalent to £7,300,000. In 1937-38 it fell to just over \$64,000,000, which, converted at the same rate, yielded just over £4,000,000, or about a quarter of the net surplus of 1928-29, and roughly equivalent to the net receipts of the Central Argentine or the B.A.G.S.R. in 1928-29.

Grain Estimates: Heavy Wheat Crop

The third and final estimate of the 1938-39 harvest, issued by the Ministry of Agriculture on May 23, is chiefly notable for the heavy wheat production, which is now put at 9,150,000 tons, and said to be the highest ever recorded, exceeding by nearly 3,000,000 tons the average for the past 10 years. This revised figure is 450,000 tons more than the second estimate issued in February last, and published in THE RAILWAY GAZETTE of March 31. Oats show an increase of 10,000 tons over the previous estimate; but linseed is lower by 140,000 tons than the previous official forecast. The following are the revised figures:—

	Tons
Wheat	9,150,000
Linseed	1,410,000
Oats	730,000
Barley	440,000

THE FAR EAST

Resumption of Traffic to Hankow

After special efforts by the Japanese engineers since February 17, the 3,000-ft. steel bridge over the Shih river, 4 km. south of Sinyang, on the Peiping-Hankow Railway, has now been repaired and reopened for traffic. The 240-km. section of line from Sinyang to Hankow has thus been officially reopened and through traffic resumed.

Dairen Harbour Extension

A six-year plan has been sanctioned for doubling the size of Dairen harbour.

The estimated cost of this work is about £5,000,000 and work is to begin this year. Some 2,600 acres of land are to be reclaimed, new piers built, and the Hamamachi pier extended. The junk dockyard is to be expanded. Work on the 5th and 6th wharves will be undertaken next year. But it is the extension by 6,560 ft. (1¼ miles) of the harbour breakwater that will double the size of the harbour and absorb much of the expenditure. The South Manchuria Railway is closely associated with the work and is undertaking the reclamation adjacent to its own land, and extending sidings and roads; it is also part-promoter with the Kwangtung Government of the Kwangtung Industrial Land Company, which is the main contractor for the various works.

NEW SOUTH WALES

Welding of Rails

Since 1933 the New South Wales Government Railways have been welding rails by the Thermit process. The total length of rails so welded has aggregated 279 miles 23 ch. of which 276 miles 37 ch. have been welded *in situ*. The better riding and lower maintenance costs obtained by welding are pronounced, and the administration recently purchased a flash-butt welding machine for installation at Chullora. In laying out the associated plant special provision has been made for handling used as well as new rails. The rails are being welded into lengths of 360 ft. and electric cranes are employed in loading on to the special flat top wagons allocated for the purpose. Approximately 300 welds a week are being made, and the cost of each weld when using 107-lb. rail works out at 8s. 4d. To the end of March, 12 miles of track had been welded by the flash-butt process. Because of the economic advantages obtained by the use of the flash-butt process, Thermit welding of the rails will in future be confined to work in the track at particular localities.

Inter-City and Newcastle Expresses

The two new trains described last week as having been built for the Inter-City and Newcastle expresses have a bright red and cream livery similar to that of earlier rolling stock. The Sydney—Newcastle section, over which they work, is 104½ miles in length and is double-line throughout. It traverses difficult country, necessitating the use of 1 in 40 ruling grades and 20-ch. rad. curves. For this reason train loads are kept down as much as possible—the new trains are only four-car—to enable the run to be accomplished in 2½ hr. or under; the best timing is 2 hr. 19 min., or at an overall speed of over 45 m.p.h., which is creditable considering conditions, even with a tare load of 180 tons behind the tender.

INDIAN PACIFIC LOCOMOTIVE COMMITTEE REPORT

This committee, appointed as a result of the judicial report on the Bihta derailment, proceeded to India last autumn and made a very thorough inspection of the broad-gauge railways. The recommendations made in its report, here summarised, include modifications to the Pacific locomotives, and further research in connection with their running when altered

LARGELY as a result of the public attention focussed on the Bihta derailment of July 17, 1937, in which a locomotive of the Indian standard Pacific "XB" type became derailed at speed and over 100 passengers in the train lost their lives, the Government of India appointed, in July, 1938, a committee of experts to investigate the whole subject of the Indian standard Pacific locomotive classes, under the chairmanship of Lt.-Colonel A. H. L. Mount, Chief Inspecting Officer of Railways, Ministry of Transport. The other members of the committee were Mr. R. Carpmal, Chief Engineer, G.W.R.; Rai Bahadur P. L. Dhawan, formerly Chief Engineer, N.W.R., India, and now Member, Federal Public Service Commission; M. Robert Léguille, Regional Chief Mechanical Engineer, French National Railways; and Mr. W. A. Stanier, Chief Mechanical Engineer, L.M.S.R. The committee was assisted by Mr. E. S. Cox, Technical Assistant to Mr. Stanier, and Mr. K. C. Bakhle, Divisional Engineer, G.I.P.R., acted as Secretary.

The terms of reference of the committee were:—

To consider the design and operation of three classes of engines, namely, "XA," "XB," and "XC" of the Pacific type, and to advise on:—

- (1) the suitability of the designs, as originally framed and as subsequently modified, for the type of work for which the engines were intended;
- (2) the suitability of the procedure followed in preparing and approving the designs for these engines;
- (3) the circumstance attending, and the justification for, the initial and subsequent purchases of these engines;
- (4) the conditions subject to which these engines can be used with safety, with particular reference to their suitability for the track on which they are required to run, and, conversely, the suitability of the track for these types of engine;
- (5) any modifications which would have the effect of increasing their scope without any sacrifice of safety; and
- (6) any modifications that should be made in the procedure hitherto followed for the trial and purchase of engines.

Characteristics of Standard Pacifics

The report, which has just been issued, is a lengthy document, containing a mass of information regarding the relationship between rolling stock and track, permanent way, locomotive design, and research. After an introductory chapter, the history of Pacific locomotives in India is fully set forth in Chapter II, and diagrams are given of the three standard classes of Pacific locomotives which the committee was called upon to consider; these we reproduce opposite with their main dimensions. In addition to those shown, the evaporative and superheater heating surfaces of the "XA," "XB," and "XC" classes were respectively: 1,600 and 384; 2,250 and 540; and 2,550 and 612 sq. ft. The ratios of adhesion were 4.24, 4.20, and 4.28 respectively.

The engines were equipped with leading bogies of a type adopted in the B.E.S.A. 4-6-0 locomotives and the earlier 4-4-0 engines, and had two small side control springs giving an initial compression of 15 cwt. and working independently. The hind truck was of the radial type with Cartazzi slides, and obtains side control from lubricated

inclined planes. It was a copy of that in successful use on the L.N.E.R. Pacific locomotives. Between engine and tender the Goodall type of coupling was used, permitting the utmost freedom of movement between the two vehicles.

These standard engines, of which 284 (113 "XA," 99 "XB," and 72 "XC") altogether were built, and the first of which was placed in service in the year 1928, have covered an aggregate of 90 million miles to date; they were preceded, in 1924, by six experimental Pacifics, two on the B.B. & C.I.R., two lighter ones on the E.I.R., and two American designed and built on the M. & S.M.R., their inception resulting from a demand for an engine that could have a wide firebox for burning low-grade coal. The report therefore includes a review of decisions taken before that time (1924), and a survey of the circumstances in which this type of locomotive was introduced and of the facts since the post-war rehabilitation.

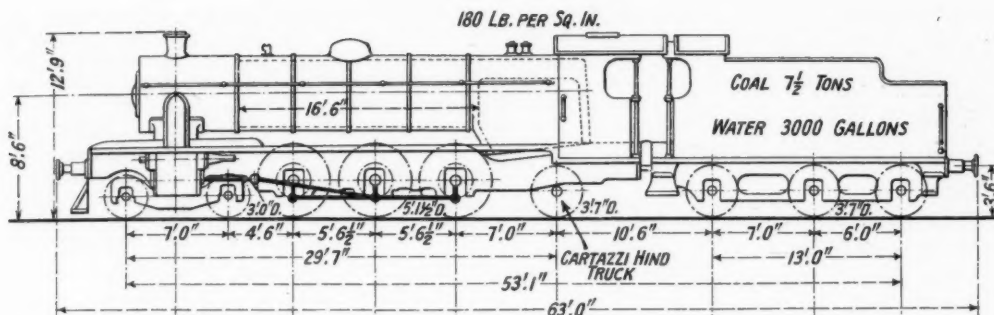
The difficulties experienced in the operation of these engines is also dealt with, as well as the steps taken to improve them. Referring to the Bihta derailment, the report states significantly:—

"At the outset, however, we think it well to state that, as our inquiry is primarily of a technical nature, we have not felt called upon to pursue the attribution of individual responsibility over so many years. It would indeed be impossible to do so, for the design and manufacture of these engines was the outcome of much committee work, and prolonged correspondence between the Railway Board, the consulting engineers, and the builders. But, apart from this, we think that consideration of what is to be done now is of more importance in the public interest, in order that mistakes may be avoided in the future."

Among certain factors taken as a basis of the design of the standard "X" class Pacific locomotives were that the axle loads were not to exceed 22½ tons for 90-lb. rail, 19½ tons for 85-lb. rail, 17 tons for 75-lb. rail, and 12½ tons for 60-lb. rail. The cylinder diameter was calculated to give a tractive effort, at 85 per cent. of the boiler pressure, approximately equal to the adhesive weight divided by 4.25; the grate area was fixed by dividing the tractive effort by 600; the evaporative and superheating surfaces were obtained by multiplying the grate area by 50 and by 12 respectively.

Defects and their Results

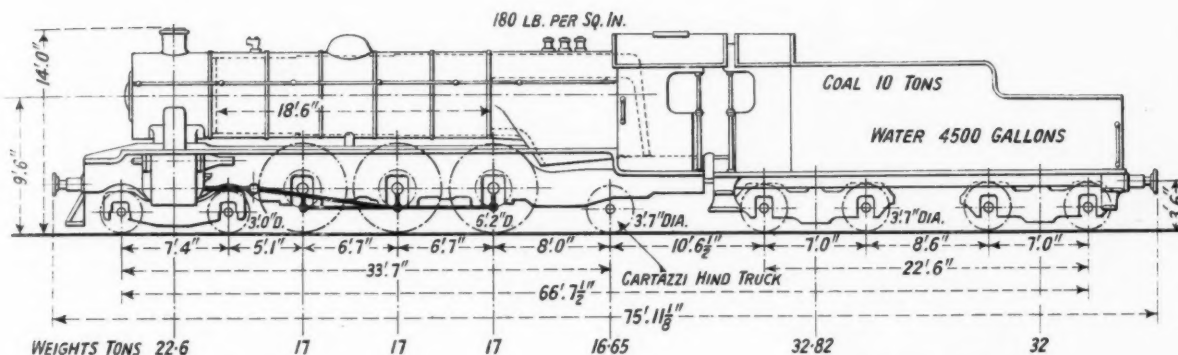
The report gives full details of the procedure adopted in the design of the locomotives, particularly regarding them as vehicles, and goes on to give an account of their performance. It is pointed out that there have been 347 frame fractures, and that 205 firebox tubeplates have had to be changed on the 284 engines; the "XC" engines on the B.B. & C.I.R. were withdrawn just prior to the committee's visit because of coupling-rod breakages, trouble which had also been experienced on other lines; on the E.B.R., operating 18 "XB" engines, the average time these spent in the shops under repair was 3 years out of a total average life of 8 years, i.e., 37 per cent. of the time. Ten derailments, prior to that at Bihta, had occurred while "XA" and "XB" engines were hauling passenger trains, attributed to hunting. Some of these accidents,



WEIGHT-TONS 15.6 13 13 13 12 14.1 14.05 14.1
 CYLINDERS 2-13"x26"
 LENGTH BETWEEN TUBEPLATES 16'6"
 GRATE AREA 32 SQ. FT.
 TRACTIVE EFFORT AT 85% B.P. 20,960 LB.

WEIGHTS-TONS
 ENGINE TENDER TOTAL
 LIGHT-----61.35 21.42 82.77
 LOADED-----66.6 42.25 108.85

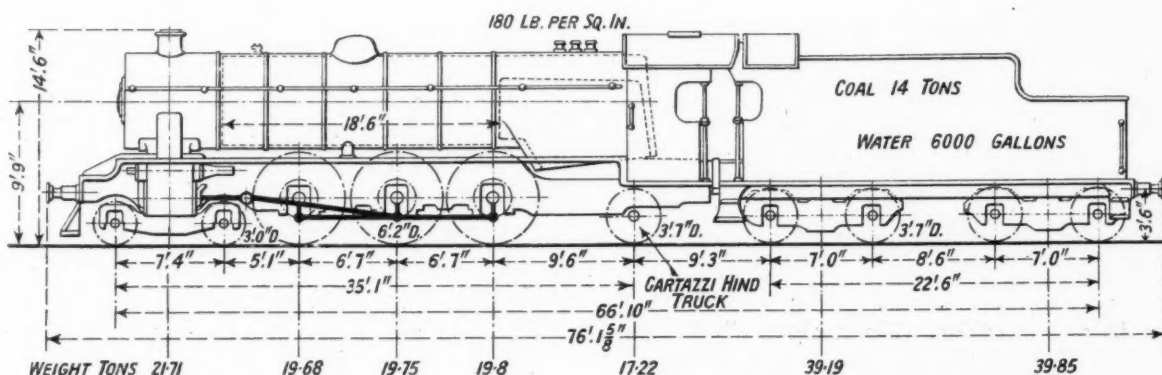
"XA" light or branch line Pacific



WEIGHTS TONS 22.6 17 17 17 16.65 32.82 32
 CYLINDERS 2-21 1/2"x28"
 LENGTH BETWEEN TUBEPLATES 18'6"
 GRATE AREA 45 SQ. FT.
 TRACTIVE EFFORT AT 85% B.P. 22,760 LB.

WEIGHTS-TONS
 ENGINE TENDER TOTAL
 LIGHT---81.65 34.64 116.29
 LOADED---90.25 64.82 155.07

"XB" medium-weight 4-6-2



WEIGHT TONS 21.71 19.68 19.75 19.8 17.22 39.19 39.85
 CYLINDERS 2-23"x28"
 LENGTH BETWEEN TUBEPLATES 18'6"
 GRATE AREA 51 SQ. FT.
 TRACTIVE EFFORT AT 85% B.P. 30,625 LB.

WEIGHTS-TONS
 ENGINE TENDER TOTAL
 LIGHT----87.04 37.45 124.49
 LOADED---98.16 78.04 176.2

"XC" heavy type Pacific

INDIAN STANDARD "X" CLASS PACIFIC LOCOMOTIVES

perhaps all, were accompanied by distortion of track. The judicial inquiry into the Bihta accident revealed that recorded track distortions by 38 "XB" and 30 "XC" engines of the E.I.R. alone amounted to 164 between June, 1928, and September, 1937.

Definitions of Disturbing Forces

The third chapter deals in considerable detail with the disturbing forces in a locomotive and the characteristics of its movement on the track, and begins with a series of definitions of terms as follows:—

Oscillation.—This inclusive term is generally used to describe movements of the engines in any plane.

Nosing.—Transverse oscillation of the engine on the track about a vertical axis. Pursuing a sinuous path along the track.

Rolling.—Transverse oscillation of the engine on its springs, about a longitudinal centre line.

Hunting.—The two movements defined above rarely occur separately, but are generally found acting together in varying proportions. The resulting oscillation is described as hunting.

Lurch.—One semi-amplitude of movement in the action of hunting, viz., an individual deflection from the centre line towards one or other of the running rails.

Shuttling.—Oscillation in a fore and aft direction parallel to the track.

Pitching.—The front and back ends of an engine alternately rising and falling about a transverse horizontal centre line; this is sometimes referred to as galloping.

Trimming.—A settling down of the engine, either at the front or rear end, so that the line of the footplate is no longer parallel to the track.

Particular attention is paid in this chapter to an investigation of the magnitude of the forces on the bogie and hind truck, and the means of their efficient control.

Modified Engines

Chapter IV is devoted to the special conditions of track maintenance in India and to considerations of weather, types of permanent way, and inspection and man power in maintenance. Chapter V relates footplate experience and Hallade recording, and numerous graphs recorded are reproduced. The engines tested by the committee were: "X" Pacifics (a) as originally built, (b) as modified with Ferodo liners on the bogie, flat slides with Ferodo on the hind truck, and German buffing gear, and (c) partially modified as above; non-standard Pacifics, B.E.S.A. 4-6-0s, non-standard 4-6-0s, and an "XC" Pacific specially modified to the committee's requirements. Two runs were made through Bihta with the engine concerned in the accident there, still as originally built; "it ran satisfactorily up to 60-65 m.p.h." Speeds up to 80 m.p.h. were registered on some of the other runs.

Summarising, the report states that the "X" class Pacifics as originally built were particularly sensitive to track irregularities. The similar engines as modified (by order of the Railway Board) showed in all cases but one no tendency to nose or hunt, but all except that one were in good condition. The partly modified engines "left something to be desired" in their running. Experience with the 4-6-0s showed them to be "little less capable of nosing or hunting" than the Pacifics, but their shorter length and lighter weight causes less tendency to damage.

The "XC" locomotive specially modified for the committee had a bogie of the laminated spring type with Timken roller bearings. It had new side control springs, giving 5 tons initial and 8 tons final control, and sidebearers of non-friction material; the hind truck had flat slides and Ferodo. The drawgear was of American type,

and the German buffing gear was modified by removing the inclined slides and fitting flat buffer heads working against Ferodo faces on the tender buffer beam; distance pieces had been fitted to the buffer spindles so that only one buffer was in operation at a time. Diagonal bracing had already been fitted to stiffen the frames between the cylinders and the leading coupled wheels. The portion of the hind truck which slides on the horns had been deepened and there were Ferodo faces on the horn guides to reduce wear.

The running was particularly smooth and steady at speeds up to 60 m.p.h. over a road with considerable curvature, and it appeared that the use of adequate bogie centring force without material friction gave as steady riding as the Railway Board's modification with high friction and low centring force. There was no opportunity to record flange forces, and it is recommended that experiments should be made to ascertain the extent of these.

Chapter VI, "Engine Maintenance," discusses *inter alia* forms of wear and play which affect hunting and other forms of side-play, and it contains drawings showing the correct and incorrect adjustment of the bogie control springs of an "X" Pacific locomotive. After dealing with points noted on various lines upon maintenance, the chapter concludes with recommendations for the organisation of maintenance.

Importance of Research

The value of research and development are stressed in Chapter VII, and the Indian Central Standards Office is commended so far as it goes, but its scope is limited to recommending more adequate organisation. Descriptions are given of methods of recording and measuring the effects of vehicles on track in America, Germany, and France. The South African derauling tests are also described. Research on this subject in Great Britain and in India is also fully dealt with, and the Railway Board's comprehensive apparatus for measuring flange forces and displacement are illustrated and described in detail. Two years of intensive investigation by special staff under the Railway Board with this equipment caused the committee to state in its report:—

"To some extent, therefore, on our arrival in India, we were presented with a *fait accompli*. Research, theory, and ordinary observation appeared to indicate that the problem was solved. Instructions had already been issued by the board for all 'X' class Pacifics to be altered, and numbers of them had already been dealt with. On the other hand, the method of curing the trouble was at variance with the fundamental considerations which we have set out in Chapter III, and it was, therefore, necessary for us to make a very close study of all the records taken, in order to throw some further light on the problem.

"Two considerations emerged. Amplitudes of oscillation had been regarded as a more important indication than flange forces, and the behaviour of the engine on straight track had been the main pre-occupation. There is perhaps some justification for the latter in that the Bihta derailment, and most of the others, occurred on the straight. It is, however, the flange force alone which can damage and displace track, and any remedial measures taken on an engine must be equally effective on curved as on straight track.

"Accordingly, we concentrated on flange forces and on curved track; from an inspection of the records, we found that, whilst flange forces were reduced to small values on the straight by the Railway Board's modifications, on curves these forces remained equally as high for the modified engine as for the original engine on the straight."

The committee suggests that the immediate object of further research should be to verify what modifications of

existing engines will effect the largest reduction in flange forces, and recommends:—

(1) That two engines of each class ("XA," "XB," "XC") should be modified as recommended, and flange forces on leading and trailing coupled and on guiding wheels recorded on both straight and curved track. The effect is required of speed, type of track, and type of formation. Trials should be carried out both in the dry weather, and under monsoon conditions.

(2) That, during the life of engines, spot checks should be made under different conditions of track, weather, and maintenance, to ensure that in no circumstances are excessive flange forces attained.

In principle, no modification should be adopted until flange force records of trial engines show that, under no conditions of reasonable railway operation, are such forces excessive. It is also recommended that the track tests be continued, and that the use of the Hallade recorder be extended.

"Knowledge of limiting resistance of various classes of track is of equal importance to knowledge of the extent of flange forces themselves, and, although investigation into the former is likely to be more laborious and protracted than into the latter, complete security cannot be ensured until reliable information, affecting both engine and track, is obtained. Close research into the 88½-lb. D. & O. [cast-iron plate sleeper] track is a matter of first importance."

After recommending extension of the scope of the Central Standards Office to include research on the various railways, the committee expresses hope that before long the Railway Board will find it possible to include a Member (Technical) who should control the Directors of Civil and Mechanical Engineering, and a Director in charge of an enlarged research and standards organisation.

Criticism of the "X" Class Pacifics

Chapters VIII to X are devoted to detailed discussions of the six terms of reference, and in the concluding chapter final remarks are made.

Under the Terms of Reference (1) the committee considers that, as power units, the engines appear to have been justified, and the selection of the Pacific wheel arrangement was a logical development from the conditions laid down. As originally designed the engines were not suitable for high-speed service as they were over-sensitive to certain conditions of track and engine maintenance prevailing in India. The selected types of bogie, hind truck, and coupling between engine and tender were unsuitable and the amount of side control provided was inadequate. The committee expresses surprise that such engines were not provided with a bogie of a design in which the controls could be altered to suit prevailing track conditions, and even when defects became apparent no serious attempt was made to modify the design of bogie to enable springs of larger capacity to be fitted. If a spring having 15 cwt. initial compression was suitable for a 4-6-0 type engine weighing 67 tons, it is shown that initial control of 5 tons was necessary to obtain the comparable centring forces of a 4-6-2 engine weighing 90 tons. The type of hind truck, although suitable for the excellent track conditions of the L.N.E.R., is now generally accepted as unsuitable for Indian conditions.

Modifications Made by the Railway Board

The various modifications made are described and discussed culminating in the final modifications recommended by the Railway Board at the time of the arrival of the committee in India. They were:—

- (1) Bogie pivots and slides to have friction liners.
- (2) Original control springs to be used with packing plates, in order to give 22 cwt. initial compression, with a final load of 50 cwt.

(3) Cartazzi inclined slides to be removed, and replaced by flat slides having a Ferodo face.

(4) German type buffing gear to be fitted between engine and tender; either the Goodall or American type drawbar to be used.

Other modifications are required, and are dealt with further on in Appendix 1. It is recommended that two engines of each of the three standard Pacific classes should be altered in accordance with the recommendations and a full series of trials carried out with each.

In any new Pacifics ordered, the committee's recommendations should be embodied with certain additions and qualifications as follow:—

Bogies.—Either the coil or laminated spring type may be used, provided they are arranged to work in parallel. All cross stretchers should be designed to avoid twist and misalignment. The main centre castings should be in one piece, to ensure that the surfaces on which the slide rests can be machined and maintained in one plane. Axleboxes should have adequate bearing surfaces on journals and between face and wheel boss.

Hind Truck.—Spring controlled pony trucks should be provided. The value of the initial side control should be appropriate to the amount of bogie control, and the load-displacement characteristic should be flatter than that of the former.

Carrying Springs.—Springs and compensating gear in stable equilibrium should be provided. Springs should be arranged under the axleboxes, and the latter should be so designed that the keeps can be withdrawn for re-packing without interfering with the spring gear.

Frames.—As having a direct bearing on the riding of the engine (*vide* Chapter III), the main frames between the bogie and the leading coupled wheels must be sufficiently rigid, to withstand the forces which tend to deflect them in the horizontal plane. An alternative position should be found for the vacuum brake cylinders, in order to allow adequate crossbracing.

Criticism of Procedure Regarding Design

The committee's views on the suitability of the procedure adopted in preparing and approving the designs (Terms of Reference 2) are summarised below:—

(1) The procedure, though modified from previous standards, was sound and practical, but involved divided responsibility.

(2) The various railways in India were not so fully consulted as they should have been in the preparation of the new designs; but there was generally no criticism of the designs from that source.

(3) The original intention to obtain the collaboration of the B.E.S.A. in preparation of the designs was not entirely fulfilled; but the committee considers that this had no bearing on what followed.

(4) The preparation of drawings and specifications for the "X" class Pacifics should have awaited more definite results of the performance of the six preliminary Pacifics.

(5) The consulting engineers failed to appreciate the importance of correct side control, the responsibility for which they share with the Railway Board.

(6) The consulting engineers should have been able to obtain a valuable lead from the experience of other countries.

(7) The consulting engineers were not asked formally to collaborate in solving the problem of oscillation, but they were generally kept informed.

(8) While the closest contact between India and London is highly desirable, and may well be encouraged by semi-official correspondence, the committee considers that important decisions should not be taken on such communications.

Reasons for Purchase

In regard to the circumstances attending and justification for the initial and subsequent purchases of these

engines (Reference 3), the committee says that the reasons for the purchase of the "X" class engines were three: (1) anticipation of greatly increased traffic, (2) need for curtailing the fuel bill, and (3) standardisation as a measure of economy. Between 1920 and 1925 the gross receipts of State-owned lines rose from Rs. 80 crores to Rs. 100 crores, an increase of £15,000,000, and further great industrial expansion was expected. The Acworth Committee impressed upon India the inadequacy of its railways and need for their wholesale rehabilitation. The whole country called for vast improvements and the Railway Board was satisfied that more powerful engines burning low-grade fuel were essential in large numbers to meet this general demand.

The committee considers that the purchase, without exhaustive trial, of large numbers of new locomotives of a new design was a mistake and suggests that the B.E.S.A. 4-6-0 type, suitably modernised, should have been ordered in the meantime.

Summary of Recommendations

In Chapter IX, the Terms of Reference No. 4 are considered and the committee recommends that to obviate the defects of the "X" class engines and improve their safety in operation, certain main alterations should be carried out. These are given in detail in Chapter IX, but are summarised as follow in Appendix 1:—

Bogie.—Spring control to be increased and alterations to be made. Surface of slides to have as low a coefficient of friction as possible, and their area to be reduced; surface to be ground to a smooth finish. Circular pivot-plate to be faced with friction material. Flanges of wheels to be increased in thickness on each side. Limits of wear and side-play to be prescribed and rigidly enforced. Ball and socket to be provided between each axlebox and end of spring cradle bar. Axlebox flanges to be tapered outwards or horn checks barrelled; dust shields to be provided.

Coupled Wheels.—Limits of wear of hub face of axleboxes to be prescribed and rigidly enforced. Tapering of axlebox flanges, &c., as on bogies.

Trailing Truck.—Cartazzi slides to be replaced by flat slides with unlubricated friction material. Lip type bearing to be standardised. Guiding surfaces of axleboxes to be increased and fitted with renewable sections; axlebox flanges to be tapered, etc., as on bogie. Thicker wheel flanges and limits of wear and side-play as in bogie.

Main Frames.—Stiffening to be provided between bogie pin and leading coupled wheels. Attention to be paid to weight distribution.

Connection between Engine and Tender.—The Goodall drawgear to be replaced by a plain bar type with independent side buffers and flat rubbing blocks. The German buffing gear, where fitted, may be retained with modifications.

Tender.—Friction material discs to be fitted to bogie centre plates. Brasses of the lip type to be fitted to all journals.

Engine Trials.—Two engines of each of the three classes to be altered in accordance with these recommendations, and a full series of trials on straight and curved track to be carried out with each using apparatus for recording flange forces. During the life of the engines, spot checks to be made under different conditions of track, weather and maintenance.

Engine Maintenance.—Mechanical inspectors, divorced from routine office work, to be appointed for the specific purpose of visiting motive power depots. These officers also to make periodical visits to the main workshops.

Speed.—The present limit of 45 m.p.h., conditionally imposed by the Railway Board, should not be raised, until tests records prove that the flange forces of engines modified to our recommendations have been reduced to suitable values. Regulations governing maximum permissible speeds of "X"

class Pacifics, should be issued by the Railway Board on recommendations of general managers, based on the advice of their engineers, and endorsed by Government inspectors. Whilst the Chief Engineer lays down the maximum permissible speeds, the Operating Department, when drawing up the working timetable, should obtain the concurrence of both the Chief Engineer and the Chief Mechanical Engineer to the maximum booked speeds. Early steps to be taken to fit speed indicators on engines operating mail and express passenger trains.

Track.—On black cotton and other weak soils, rigid sleepers, preferably timber, should be used. Systematic research into the problem of the best method of blanketing and ballasting on various soils should be undertaken, as well as research to determine the lateral stability of tracks, with different kinds of sleepers, commencing with the D. & O. plate sleepers. The number of sleepers to be raised to a minimum standard of $N + 3^*$ for all main lines, increased where necessary on weak formation and on curves. Where the heavier "X" class Pacifics run on tracks weaker than the standard 90-lb. F.F., renewal with the standard permanent way should be carried out within an economically practicable period.

Extended use to be made by civil and mechanical engineers of the information afforded by the Hallade track recorder or similar apparatus. Special testing cars should be introduced. Manning standards of main-line permanent way gangs should be reviewed. The system of training of permanent way staff should be encouraged and extended. The recruitment of literate gangers is worthy of consideration.

In brief, the committee is of opinion that the "X" classes have many more years of useful life before them, provided that such modifications are made in them as are proved by thorough research to ensure smooth running under all reasonable conditions, and on the assumption that suitable speed limits are prescribed according to the design and condition of the permanent way. The committee adds that apart from hunting the "X" class engines have given trouble in respect of their frames, firebox tubeplates, bogie axleboxes, and coupling and connecting rods. In addition to suggested remedies in these respects, the committee has, from observation, certain recommendations to make concerning their cylinders, valve gear, steam passages, and regulators. The Railway Board had, however, already taken action in most instances.

In its concluding remarks the committee draws the attention of the Government of India to the comparative ease with which false economy can be effected, with, perhaps, misleading creditable results, and to the serious economic and psychological consequences of persistent financial pressure.

We comment on the report in an editorial article on page 4. References to articles in our columns descriptive of various locomotives or dealing with other points raised in the report are as follow:—

Summary of matters connected with the Bihta derailment: September 9, 1938; pages 442-3.

Summary of Bihta judicial inquiry report: April 29, 1938, pages 824-5.

Description, illustration and diagram of "XB" class, May 20, 1938; pages 986-7.

Description and illustration of Denham and Olphert (D. & O.) plate sleeper, pages 986-7.

Description of "XB" class, December 23, 1927.

Description of "XC" class, November 22, 1929, and September 12, 1930.

Description of "XA" class, August 28, 1931.

Also in *The Railway Engineer* of February, 1928, was published an article with illustrations and descriptions of the "XB" under construction.

* N = length of rail in yards

BEGINNING OF THE GAUGE CONTROVERSY

The first important fight over the adoption by the G.W.R. of the broad gauge resulted in a victory for Brunel one hundred years ago

By W. G. CHAPMAN

DESPITE eulogistic press reports on the opening of the first section of the Great Western Railway (the 22½ miles between Paddington and Maidenhead Bridge) on June 4, 1838, the early train journeys were not the success which had been expected and, while this was due partly to defective locomotives supplied by various contractors, the rigidity of the permanent way also contributed, with the result that there was a great deal of hostile criticism of the railway. Prominent among those responsible for unfavourable comments, which in some cases amounted to ridicule, was a party of North of England shareholders, seeking representation on the board, who became known as the Liverpool Group. Even before the opening of the railway, they had been something of a thorn in the side of the directorate and their unfavourable criticisms were directed particularly against Brunel, the young engineer, who was constructing the railway in ways so dissimilar to those with which they were familiar in the north.

Brunel was daringly original, and preferred to proceed according to his own convictions rather than follow precedent in railway construction. Not only did he adopt a gauge of 7 ft. 0½ in., but his method of laying the track was his own. On the London & Birmingham Railway some 152,000 tons of stone blocks had been used as sleepers, and Brunel had originally proposed to use Penant stone for his railway, but substituted heavy longitudinal timber sleepers. These were 30 ft. long, with cross-ties or transoms at intervals of 15 ft., carried under both lines and laid in pairs at the end of the longitudinal sleepers, where they were bolted to long piles driven into the ground. Brunel made another departure from previous practice in introducing bridge rails of his own design; these were secured to hardwood planks and fixed, without chairs, direct to the sleepers.

Brunel was by no means alone in departing from the narrow gauge, for about a hundred miles of what is now the London & North Eastern Railway had been constructed to the 5-ft. gauge, while in Scotland lines had been laid to 4 ft. 6 in., and 5 ft. 6 in. gauges. There can be no doubt that this question of gauge was one to which Brunel had given earnest consideration, and he was convinced that better results could be achieved with a broad gauge which would enable wide comfortable coaches, slung between large-diameter wheels, to be used. Thus he would secure a low centre of gravity, which, in his considered opinion, would make both comfortable and safe travel at really high speeds such as had not been attempted elsewhere.

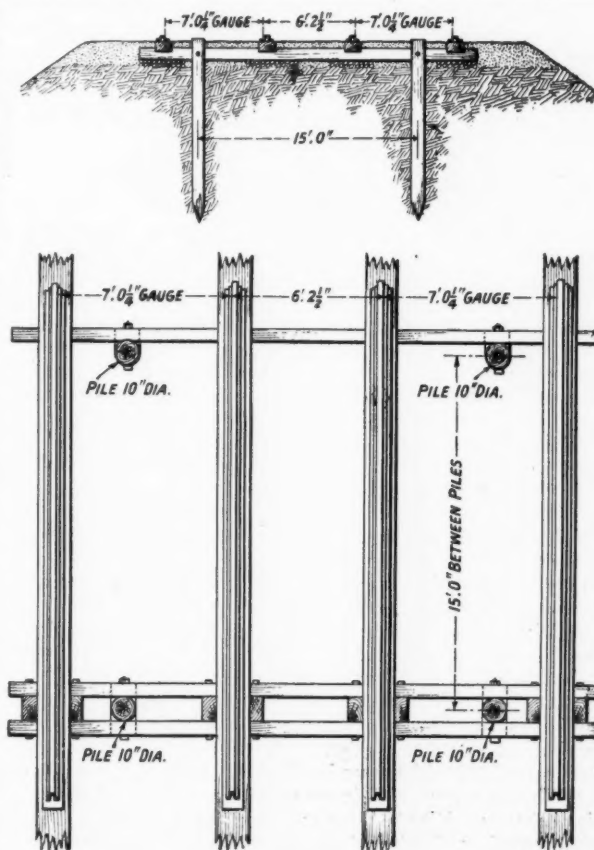
In this connection, it is interesting to have the testimony of the late Sir James C. Inglis, who was himself Chief Engineer (1892-1903) and General Manager (1903-1912) of the Great Western Railway. Speaking of his famous predecessor in his presidential address before the Institute of Civil Engineers, he said: "When the majority of railway engineers and promoters were looking to railways as mere improvements of public roads, on which vehicles were permitted to pass on payment of tolls, he had a clear perception of their enormous possibilities, in regard to the conveyance of both goods and passengers at high speed."

It is not, perhaps, generally known that the Great

Western Railway Bill of 1834, which was defeated after strenuous opposition, specified the narrow (now standard) gauge of 4 ft. 8½ in., but in the Bill promoted in the following year, which became law on August 31, 1835, the gauge-defining clause was omitted as the result of representations made by Brunel. We are indebted to the diary of Mr. G. H. Gibbs, an original Director, of the Great Western Railway, for much interesting information regarding the controversies of this period, and it was in connection with the hostile criticisms of members of the Liverpool Group and their intimation to call a special meeting of the shareholders to air their grievances, that he wrote under date July 16, 1838:—

"... the present controversy . . . has much less to do with the deficiencies of our rails than with the machinations of the party which has long been trying to crush Brunel and get a share in the management of our line."

In view of the criticisms made, Brunel had already suggested that two or three engineers of ability should be called in to give their opinions on the matters at issue, and in July, 1838, Nicholas Wood, James Walker (President of the Institute of Civil Engineers), and Robert Stephenson were approached. Both Walker and Stephen-



Section and plan of early G.W.R. broad gauge track

son declined the task and, though Wood accepted, he could not begin his survey until September.

Meanwhile the continued abuse and ridicule levelled at the G.W.R. were doing a good deal of harm, and Brunel made a full report, which, together with a report from the directors, was read at a crowded half-yearly meeting held at Bristol on August 15, 1838. In this report Brunel's position was materially helped by the fact that a Royal Commission had just recommended a standard gauge of 6 ft. 2 in. for the railways of Ireland. The opposition was in strong force at the meeting, and some objectional resolutions were proposed, but not pressed to a division. After seven hours of discussion, an adjournment was made until October 10. Some idea of the tone of this meeting is furnished by the following excerpts taken from a letter written three days later by Mr. G. H. Gibbs to his sister:—

"... The meeting was characterised by the conciliatory spirit and good humour of the Chairman, which produced a good effect on all; by the extraordinary praises which were lavished on the Directors by all the Liverpool people; by the ability with which these men addressed the meeting, and by the extraordinary fact that everything which Brunel and the Directors had done was praised by one or other of them. One, the most violent, declared himself a decided friend to the wide gauge, others lauded the longitudinal bearings but abused the other parts and one man requested that the piles might not be abandoned till we had given them a longer trial.

"... The gentleman who moved for a Committee of Inquiry did it in the most honeyed complimentary language and begged to refer for his justification to a clause in the Act, which, on being read, was found to be intended to meet cases of fraud and unsatisfactory accounts. The most violent of the party was full of smiles and appeared to be the most good-tempered fellow in the world, whilst his resolutions and his bitter words sadly belied his countenance, and, to give you an idea of the man, he said himself afterwards, that he knew perfectly well that it would be an absurd and unpracticable thing to have two Head Engineers and that he only used it as a peg to hang his arguments upon. . . ."

The pressure on the directors by the Liverpool group continued without cessation until it was agreed to appoint John Hawkshaw,* the young Engineer of the Manchester & Leeds Railway (who promptly accepted) to report with Wood upon the points under discussion. The appointment of a consulting engineer was also pressed for, and the hostile critics might possibly have had their way had not their request been coupled with another for the inclusion of one of their number on the board of directors. Hawkshaw was not long in carrying out his inspection, nor in drawing up his report, for it was received in the first week of October, 1838, and, in effect, flatly condemned the broad gauge and practically all Brunel's methods so far as the track was concerned. Hawkshaw recommended the adoption of the 4 ft. 8½ in. gauge, showing on his report, that it would result in a saving of £30,000 for the whole line. Mr. G. H. Gibbs refers in his diary to Hawkshaw's report as "a very ill-natured production from beginning to end, the greater part of which might have been written without coming near the line," but Hawkshaw certainly foresaw what Brunel, with all his imagination, seems to have been unable to realise, that sooner or later it was isolation that would cause the demise of the broad gauge.

Wood's report was not received until December, and in the meantime the adjourned meeting of October 10 had passed off without undue incident, all parties waiting for Wood's report. This was much more detailed than Hawkshaw's. Wood seems to have shared Brunel's views with regard to the broad gauge, and not been influenced

by Hawkshaw's arguments; in fact, on the question of gauge, he was neither decided nor helpful. Wood, however, definitely condemned the use of piles for anchoring the track to the ground. With such conflicting reports, and the Liverpool Group's insistence upon the appointment of a consulting engineer, it is not surprising to learn that some of the directors (particularly of the Bristol Committee) began to lose confidence in their Engineer. Happily, however, Brunel was more loyally served by the London Committee, and he had a staunch friend and supporter in Mr. G. H. Gibbs, then the Deputy Chairman of the company.

The upshot of the matter was that a special meeting of shareholders, to determine the question of gauge and future policy of the railway, was called at the London Tavern, Bishopsgate Street, on January 9, 1839. The directors had circulated a report in which they quoted from, and commented upon, the engineer's reports, and recommended retaining the broad gauge, and abandoning the use of piles in the track. On the fateful day, the report was duly moved and seconded, but the opposition had come to the meeting armed with an amendment to the effect that Wood and Hawkshaw's reports proved that the methods adopted by Brunel were "injudicious, expensive, and ineffectual," and should not be proceeded in. This amendment was put to the meeting, and, after a poll had been demanded, declared lost. The original motion was then submitted and carried unanimously. Thus, a hundred years ago, this year, Brunel's broad gauge was established for better or worse not only on the original Great Western Railway (London to Bristol) but also on some hundreds of miles of railway which were ultimately to become part of the undertaking.

It is only fair to add that from then onwards, the Liverpool Group ceased to be hostile, and according to Mr. Gibbs (under date February 12, 1839, after the board meeting at which the minutes of the meeting of January 9 were confirmed) "were disposed to co-operate cheerfully with the directorate." The diarist added: "This was very gratifying, particularly to me, as it showed that by firmness we had secured their respect, kept them out of the direction, retained our Engineer, and preserved our gauge." The second section of the G.W.R.—the 8½-mile extension from Maidenhead (old station) to Twyford, including Brunel's flat-arch brick bridge across the River Thames—was opened on July 1, 1839, bringing the broad gauge mileage up to 30½.

The victory gained, however, was but temporary, for within a few years the "Battle of the Gauges" was at its height, and resulted in the appointment of a Royal Commission which in 1846 (while paying tribute to "the genius of Brunel and the liberality of the Great Western Railway") recommended the adoption of the 4 ft. 8½ in. gauge as standard. That report sounded the death knell of the broad gauge, though its complete passing was delayed until 1892—a third of a century after the death of the famous engineer responsible for its introduction.

AMERICAN LOCOMOTIVE MILEAGE.—According to a report by M. André Chapelon, of the French National Railways, who recently returned from a visit to the United States, the first 4-6-4 "J3a" class locomotive of the New York Central System covered 210,000 miles in 16 months before being given its first heavy overhaul. On the New York, New Haven & Hartford Railroad, although the main line is only 160 miles long, the best express engines make an annual mileage of 120,000 to 175,000, and certain high-speed steam engines on the lines running out of Chicago have covered as much as 25,000 miles in a month.

* Later Sir John Hawkshaw

SIGNAL SIGHTING IN DIFFICULT LOCATIONS

Tropical conditions increase sighting difficulties and raise special problems

By H. C. TOWERS, Signal Engineer, Metre-Gauge Lines, B.B. & C.I.R.

SOME aspects of the progress made with light signals were reviewed in THE RAILWAY GAZETTE for March 3, 1939, page 341. As a rule, such signals can be applied to improve sighting conditions, with the attendant advantages of constancy of aspect, absence of moving parts and simple maintenance. It may therefore be of interest to make some observations on the merits and disadvantages of light signals in the tropics, where conditions unknown to Europe are encountered.

Interference from Overhead Structures

In most tropical countries, and possibly in some other parts of the world, where the suburban area of a railway is electrified, the overhead system of current collection has to be employed, generally because of the great difficulty of preventing trespass. The overhead structures used for supporting the wires then interfere seriously with the sighting of semaphore signals. To provide satisfactory sighting with that type of signal, it must be placed fairly low, so that the arms can be seen beneath the structures, a condition often impossible, however, because of gauges and clearances. The alternative is to provide high signals with co-acting arms, but that is very unsatisfactory from the point of view of engine crews, as the sighting of the arms is continually intercepted by the structures. Phantom indications are often conveyed by the corner bracings, which can sometimes delude drivers into believing that they have seen a signal arm in the "off" position. During the monsoon season in India, when heavy rain and mist are often present, signal sighting under such conditions becomes for those on the footplate little less than a nightmare.

The Value of Colour-Light Signals

The colour-light signal is the signal engineer's salvation in such cases. Its construction allows it to be erected clear of standard dimensions and yet provide an aspect that can be seen beneath the avenue of structures, as though in a tunnel. Where dimensions prevent the mounting of the lamp case at the top of the pipe post, the latter can be erected clear and the signal unit brought into correct alignment by means of special brackets. Trees notoriously give rise to many signal sighting problems, and where they are on station platforms remedial measures in the form of wholesale lopping are looked on as vandalism. Outside station yards the outermost signals are frequently obscured by trees not growing on railway property. In India, tactful negotiations have then to be made through the local authorities, generally ending in the owner consenting to the trees being cut, providing compensation is given. If a tree happens to be growing in a temple, or is of a sacred nature, it cannot be touched, and other measures have to be adopted to improve the sighting. When power is available to work them, colour-light signals have been found to be a certain cure where semaphores have been badly backgrounded by trees. The writer had experience of two miles of railway immediately adjacent to a main road, an avenue of tall palm trees running along each

side. They formed a very bad background for semaphores, making it almost impossible at certain times of the day to detect them. Colour-light signals have since taken their place.

Difficulties in a Hot Atmosphere

Locations can be found where semaphore signals provide a superior aspect to the colour-light; in other cases neither is really satisfactory. In less populated and more or less desert country places can be found where the intense glare and heat of the summer sun produces haze conditions, making signals almost invisible although otherwise there is no obstruction in the way. The position is further complicated if an arm is backgrounded by a hill. Battery operated multiple unit and searchlight signals have been tried out in these cases, but at some locations the atmospheric conditions during hot weather are entirely against such signals, and the experiments were abandoned. Red was found to be the best colour for visibility, as it could be seen from a greater distance than yellow or green. Advocates of the colour-light signal may find this hard to believe, but it is a matter of experience and merely proves that each type of signal has its advantages. Under such difficult sighting conditions it is doubtful if any one type of signal can claim superiority.

Warning Boards Useful

In the writer's experience, the usual sighting distance required by Indian locomotive departments is half a mile, and where, because of conditions stated above, this cannot be given, a warning board is provided at the spot where the signal should ordinarily be sighted. The letter "S" is used, cut out of iron and screwed to a board, thus not requiring a skilled painter to re-paint it every year; the tropical sun bleaches or darkens paint very rapidly. The sign attracts the attention of the engine crew, who can be on the alert and ready to slow down if signal indications are adverse.

A similar type of board can also be used as an approach warning to interlocked level crossings between stations. Where these crossings are situated on curves and in cuttings, signal repeaters or distants are ordinarily necessary to provide adequate sighting. Warning boards used in place of the repeater signals are cheaper and just as effective. Cast iron letters, fitted with "cat's-eyes," which provide a brilliant indication in the beam of the engine headlamp at night, are employed.

In a hot country footplate conditions are by no means ideal. The driver has to contend with all the discomforts of running in the heat and glaring sun, receiving caution orders for engineering works, looking out for engineering signals, checking tablets or other tokens if on a single line, keeping time, and so on, besides having to put up with such physical irritants as flying coaldust, insects, and dust storms. It is, therefore, in the interests of the enginemén and the public to provide the best signal aspects possible, and auxiliary warning appliances where sighting is inadequate and cannot be improved.

4-8-2 TYPE LOCOMOTIVES FOR BRAZIL

Metre gauge engines with welded-steel trailing trucks for passenger service on the Rio Grande do Sul Railway

REFERENCE was made recently to some large 2-8-2 locomotives built in Australia,* having booster-fitted trailing trucks with fabricated framing composed of steel plate and welded. A similar form of construction was also adopted in some 4-8-2 locomotives built last year for service on the Rio Grande do Sul Railway of Brazil by the Berliner Maschinenbau, A.G. (vormals L. Schwartzkopff), at the Wildau works, Berlin. As will be seen from the illustrations, the truck is of the single-axle Delta pattern, and the material used for the frame is steel, complying with Reichsbahn requirements, and known by the symbol St. 37-21. The tensile strength is 37/45 kg. per sq. m., with elongation from 18 to 20 per cent., or 23 to 29 tons per sq. in., corresponding approximately to B.S.S. No. 24. The whole of the framing was built up and electrically welded. A fabricated frame of this kind has reduced the weight considerably. The frame alone, without fittings, is stated to weigh about 1,000 kg., say, 1 ton, whereas if made as a steel casting, it would weigh about 1,600 kg. or some 1½ tons.

The locomotives for which these trucks are used are of the bar frame description, and may be said to follow conventional practice in all other respects. On account of the fuel used, which is coal of a low heat value with a high ash content of about 30 per cent., the boiler is of rather large proportions, and the grate area provided is liberal—48·4 sq. ft. The combined heating surface is 2,604 sq. ft., and superheated steam at 235 lb. per sq. in. pressure is supplied to cylinders 19·7 in. by 26 in., which in conjunction with coupled wheels of 4 ft. 9 in. diameter gives a rated tractive effort of 34,200 lb. The cylinders

are cast with half saddles, and the valve chests have bypass valves fitted in a passage way cast with the cylinders. Steam distribution is by piston valves actuated by Walschaerts motion, controlled by power-operated reversing gear. One engine was fitted with the Loco Valve Pilot, and one with a type H.T. mechanical stoker. The rods are all of fluted section, and it will be noted that the connecting rod big ends are of the strap pattern with cotter adjustment, as against the now common solid end form. It may, however, be mentioned that as a rule Continental designers prefer adjustable bearings, not only for the main rods but for the coupling rods as well. The large ash pan with outside hopper will also be noted.

Overhung compensated spring gear is used, and the springs for the trailing truck connect with those of the trailing coupled axle. The tender bogies have cast steel side frames and are of the spring bolster pattern. Thanks are due to the builders for the photographs and for the other particulars. A few of the leading dimensions are given in the following table.

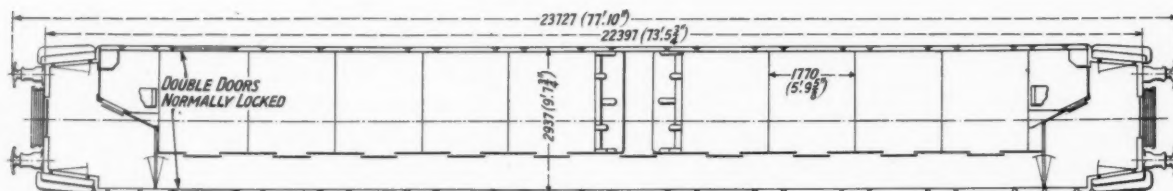
Cylinders, dia.	500 m.m.	19·7 in.
" stroke	660 m.m.	26 in.
Wheels, driving dia.	1,500 m.m.	4 ft. 9 in.
Boiler pressure	16·5 at.	235 lbs. per sq. in.
Combined heating surface	242 M ²	2,604·0 sq. ft.
Grate area	4·5 M ²	48·4 sq. ft.
Tender, coal capacity	10 tons	9·8 tons
" water "	18·0 M ³	3,950 galls.
Weight of engine	80 tons	78·6 tons
" tender	50 tons	49·2 tons
Total weight in working order	130 tons	127·8 tons
Rated tractive effort at 85 per cent. of the boiler pressure	—	34,200 lbs.

The engines are intended for passenger traffic, and they represent a development of a similar consignment delivered in 1925.

* Redesigned "X" class freight engines built at the Newport shops of the Victorian Government Railways; see page 270, THE RAILWAY GAZETTE, February 17

COACHES CONVERTIBLE AS AMBULANCES

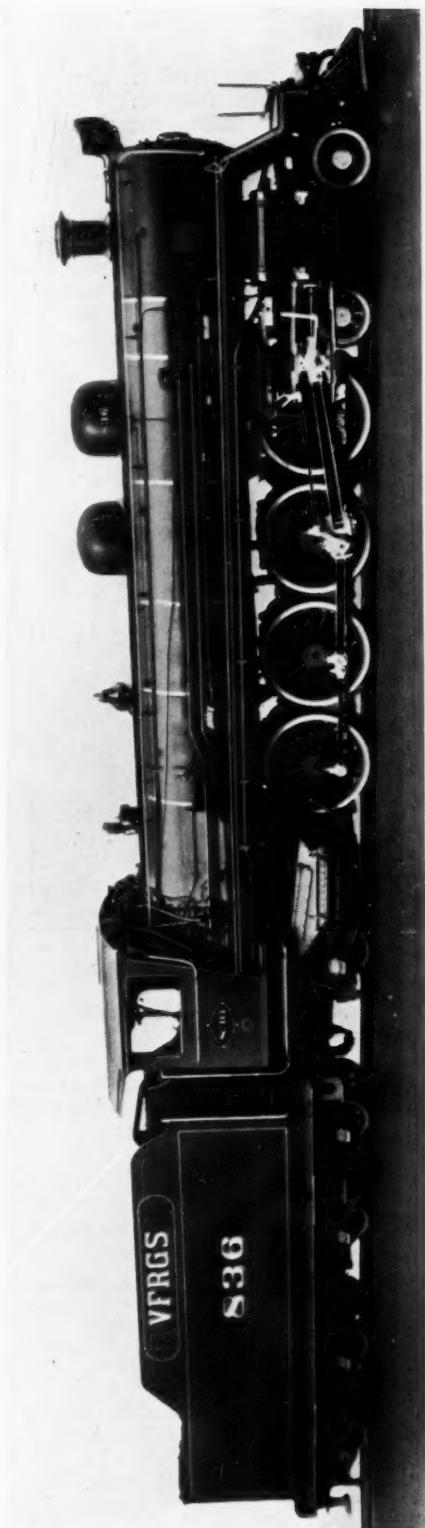
Third class vehicles of the French National Railways designed for conversion as ambulance coaches when required



ASERIES of new third class coaches designed so as to be convertible into ambulance vehicles when required has been built for the French National Railways by De Dietrich et Cie., of Niederbronn. In ordinary passenger service they are used as side-corridor carriages with ten compartments, each seating eight persons. All interior partitions except those at the ends separating the seating portion from the vestibules are easily removable, and when the vehicle is thus cleared bunks can be installed for the transport of sick or wounded.

The vehicles are of all-steel girder construction. Access

to the compartments in passenger service is through the end vestibules, but for ambulance purposes there is a pair of double doors at each side, allowing easy passage for stretchers. Supports for the suspension of stretchers inside the vehicles are fixed to the floor and ceiling. The ordinary heating radiators are removed with the compartment partitions, so for ambulance heating provision is made for mounting a stove at each end of the car, beneath an aperture for a stovepipe in the ceiling that is normally kept covered. A duplicate lighting circuit switch-board is installed for use when the partitions are removed.



New 4-8-2 locomotive for Rio Grande do Sul Railway



Welded steel trailing truck of new 4-8-2 locomotive for Rio Grande do Sul Railway



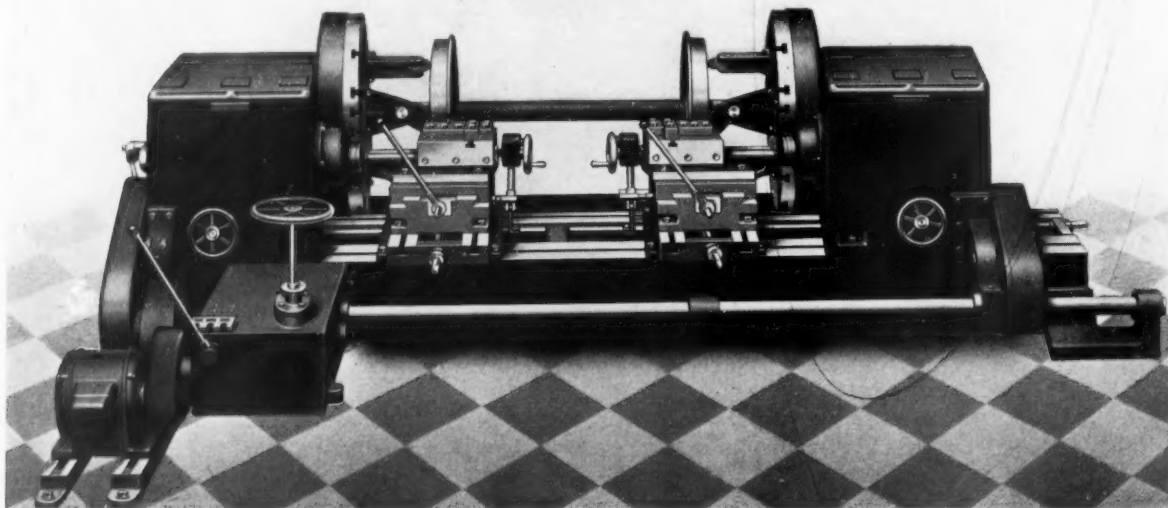
*Booster-fitted welded trailing truck used on Victorian Government Railways
2-8-2 locomotives, similar to design of truck on left*

A NEW RAILWAY WHEEL LATHE

Medium duty 48-in. machine with double headstocks

THE machine illustrated is a 48-in. medium duty double railway wheel lathe manufactured by the Oldfield & Schofield Co. Ltd., of Halifax. Inspection of the machine shows it to be robust and well designed, containing all the necessary and approved features required in a wheel lathe and exhibiting high class workmanship throughout. The machine consists of a deep box-section bed carrying two driving headstocks, the right-hand one arranged to traverse along the bed as required. Two sets of compound tool slides with power longitudinal and surfacing feeds are provided, and the machine, which is massively constructed, is capable of maintaining a maxi-

securely bolted to the spindle flange, and the large gear rings are bolted to the backs of the faceplates. The faceplates are also provided with tee-slots to accommodate the drivers. Two front tool rests are provided, which can be moved to any desired position along the bed by lever and rack pinion, and securely bolted to the bed. The top rests are of steel and are fitted with multiple tooling layouts arranged to suit individual requirements. The top rest can be set over to suit the angle of tread of the tyre. The surfacing slide moves parallel to the faceplates. The rests are of substantial construction and are so designed that the upper slide gives a maximum covering to the



Driving side of Oldfield & Schofield double-headstock lathe

mum output without undue exertion on the part of the operator. The bed is adequately ribbed to prevent distortion under the heaviest cuts. It is plated the entire length and has broad bearing surfaces with accurately planed tee-slots for the headstocks and rests.

The drive is by a 30-h.p. electric motor through reduction gear to a six-change gearbox, having gearwheels of high tensile steel. The gearbox is firmly bolted and dowelled to the front of the bed and also securely bolted to the foundation. From the gearbox the drive is taken through the mainshaft in front of the bed and reduction gears to the headstocks. The latter contain further reductions to the faceplate, the pinion of which is forged solid with the shaft and has an extra bearing on the outside. All the pinions are of high tensile steel, with the larger wheels of cast steel. The headstocks contain dog clutches to enable the faceplates to be revolved freely and independently. They are of box form and contain all the necessary gearing. The spindles, of large diameter, are made of close-grained cast iron. They revolve in split phosphor bronze bearings and the main spindles have inner sliding spindles to carry the collets. These spindles, which are of exceptional length, are adjusted laterally by handwheel with suitable lock to prevent creeping when the lathe is in motion.

The faceplates are of cast iron of strong section and

lower slide and thus prevents the slides from damage by dirt and chips.

Automatic ratchet feeds are provided to the top tool slide and the surfacing slide. The feed is taken from the faceplate pinion shaft, thus giving several feed impulses per revolution of spindle. The motion is strong and of simple construction, being easily varied, stopped, started, and reversed. Four rates are given, namely $\frac{1}{16}$ in., $\frac{1}{8}$ in., $\frac{3}{16}$ in., and $\frac{1}{4}$ in. per revolution of spindle. The controls are placed in the most convenient positions with ease of operation the first consideration.

A PNEUMATIC-TYRED RAILCAR IN CHINA.—A novel railbus is described in the annual report of the Kowloon-Canton Railway (British Section). The vehicle was constructed in the railway locomotive workshops, from two 3-ton Bedford lorry chassis, welded end to end, with the tyres supplemented with cast steel discs. The body is designed to carry 45 third class passengers with their agricultural produce, and has wide central doors. The petrol consumption works out at 8.6 m.p.g. and running expenses at 13.2 cents a mile. Maximum speed is 37 m.p.h., with remarkable powers of acceleration and deceleration. This vehicle is believed to be the first railcar in China running on pneumatic tyres.

DETECTING TRAIN MOVEMENTS BY RADIO

A French device for actuating warning apparatus especially for the protection of permanent way gangs

AN interesting apparatus, intended to signal the passage of a train at some point of the line and offering an attractive solution to the problem of protecting workmen on the track, has been devised by the Société Française Radio-Electrique. Its advantage is that it can either be installed permanently at a given point, to operate a level crossing warning signal for example, or set up temporarily with little difficulty to provide protection for permanent way gangs. In principle it is a wireless transmitter radiating a constant influence which acts on a relay controlled by a wireless receiver at the desired point, thus setting the signal in action when transmission is interrupted, *i.e.*, whenever a train passes the transmitter. The latter uses a wavelength of 5 m., and consists of a pentode oscillator tunable by variable condenser from 4.5 to 5.5 metres. In practice the set is permanently tuned to the selected frequency when put into service and locked by a set screw. The filament of the transmitter valve is heated by a 12-volt storage battery, which also feeds a small converter providing the 110-V. 600-cycle a.c. for the anode. The set is in a small case, on top of a larger one containing the battery. A quarter wave-length tubular aerial is carried on the same case by insulators, the whole being easily transportable. A counterpoise (in place of an earth connection) is provided by a piece of wire netting 1.25 m. long and 0.5 m. wide (4 ft. 1 in. by 1 ft. 7 in.), stretched on a wood frame held in position between the track rails by woodscrews; the set itself is placed at any convenient spot beside the track.

The receiver is the same size as the transmitter. It has three pentodes, acting as detector, amplifier, and rectifier for the klaxon relay. Tuning is effected once and for all when the apparatus is put into service but adjustments can be made, if required. The valve filaments are fed by a 6-volt battery, which also feeds a converter producing 2,000 V. filtered d.c. for the anode circuits. The receiver operates a relay, normally held closed by the current detected by the receiver. As soon as reception ceases, however, it opens, starting the klaxon horn. To ensure absolute reliability a double klaxon system is provided, one horn operating on the normal battery, the other on an emergency one should the first circuit break



Apparatus for sending warning signal to protect permanent way gangs on a French railway

down. Tests show that the radio waves follow the track superstructure, so avoiding interference with local receivers. The accompanying illustration shows the equipment in use on a French railway. The question of warning men at work on the permanent way has attracted much attention of recent years, and we have suggested in these columns that it might well be discussed at the next International Railway Congress.

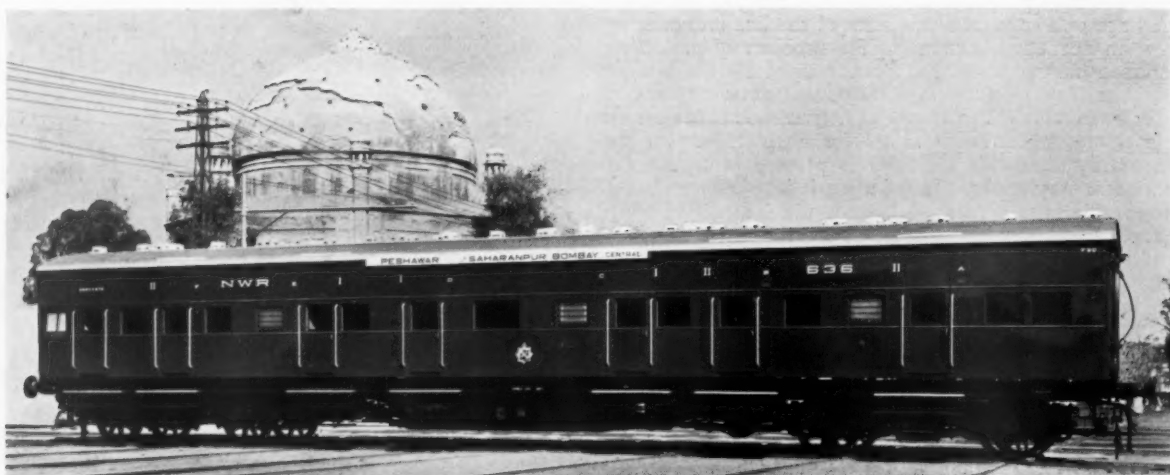
The First American "Train Order"

The *Erie Railroad Magazine* for June gives an account of a broadcast from Newark, N.J., on May 10 recalling the sending in 1851 from the Turner (now Harriman) station of the first telegraphic "train order" by the then General Superintendent of the Erie, Charles Minot, with the object of holding an opposing train to allow his own to proceed. A monument was unveiled at the station in 1912 to commemorate the event. The idea was no doubt original to Minot himself, but he was certainly not the first either to do or think of such a thing. The eminent English pioneer of telegraphy, Sir William F. Cooke, published in 1842, under the title of "Telegraphic Railways; the Single Way," complete proposals for operating single track lines with safety and flexibility by his needle telegraph instruments. They were adopted on the Blackwall cable line in 1840, and the Norwich & Yarmouth Railway, opened in 1844, was worked on his plan.

Should a train be "casually delayed" wrote Cooke, "a fresh arrangement would be made by telegraph," a clear anticipation of Minot's idea. Working such lines by "crossing orders," as they came to be called in England, was afterwards superseded by token working, owing to the risks of mistake inherent in the former. A serious head-on collision, involving 25 deaths, occurred on the Norwich & Yarmouth line itself on September 10, 1874, due to a crossing order being sent off incorrectly. Many blunders have been made in America with the dispatching system and for some years automatic track circuit signalling has frequently been added to provide the extra security required and prevent the grave results that can arise from error or carelessness in dealing with "train orders." More extended reference to Cooke's proposals appeared in our issues of March 20, 1936, page 558, and July 30, 1937, page 191.

NEW PASSENGER CARRIAGES, N.W.R., INDIA

These first and second class composite bogie coaches embody many improvements for the comfort of the passenger



One of the new first and second class composite coaches, N.W.R.

TEN new first and second class bogie composite carriages were recently built at the Moghalpura shops of the North Western Railway. Intended primarily for service on the Frontier Mail and Karachi Mail trains, they contain many innovations and represent the latest development in coach building in India. We are indebted to Mr. L. N. Flatt, Chief Mechanical Engineer, for the following details.

The accommodation in each coach is shown in the plan. A departure from previous practice is the placing of all first class berths athwart the carriage instead of longitudinally along the windows.

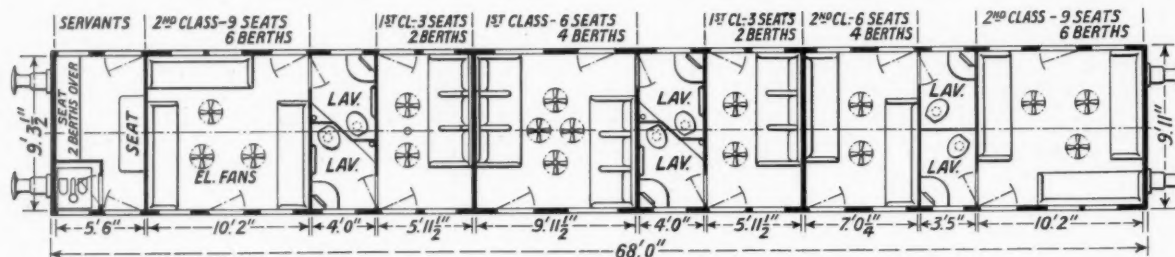
The exterior panelling is of Masonite Tempered Presdwood finished with synthetic enamels and varnishes supplied by Robert Ingham Clark & Company. The external finish is in light Indian red with the handrails, &c., in primrose, the standard livery of the N.W.R. The interiors are panelled with Masonite Hardboard. In the first class, this is covered with Rexine, dark blue or dark green up to the waist rail and lighter shades above. In the second class, the Hardboard is painted over with Duco lacquer in two shades of green. The upholstery in both classes harmonises with the darker shades. The ceilings are of Masonite Hardboard with cone boards of Insulite. The flooring composition—blue or green to

match the colour schemes—has been supplied by The Oxy-Chloride Flooring Products Limited.

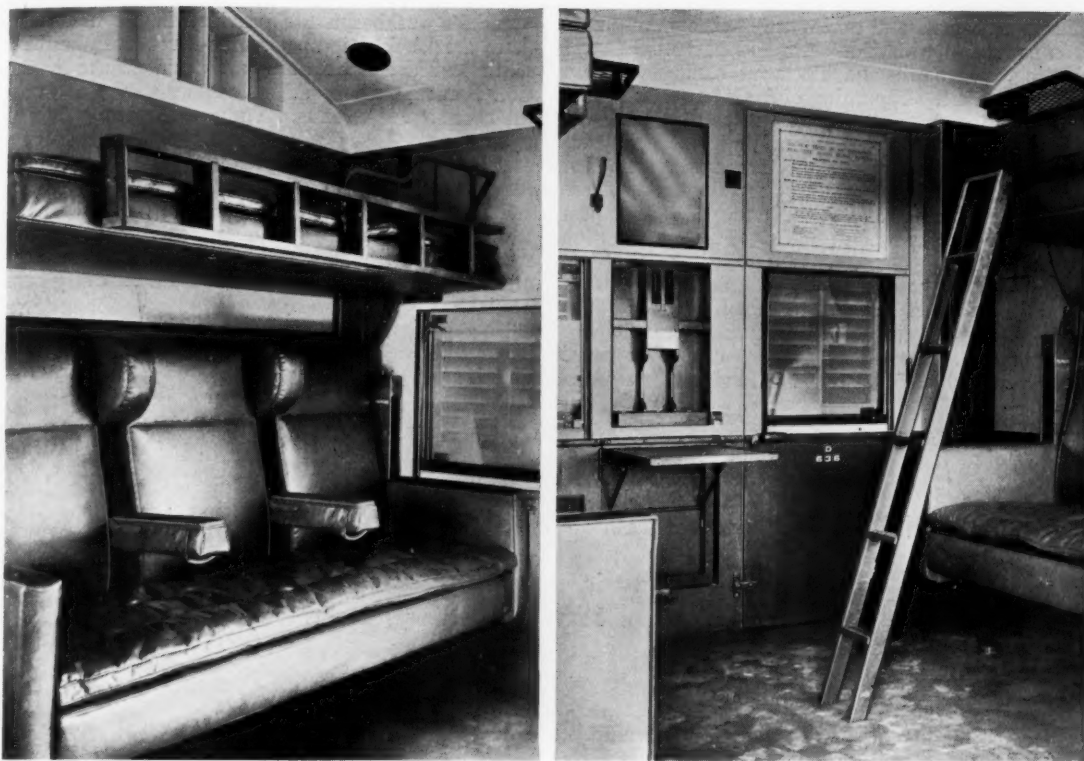
Sleeping and Seating Comfort

Special attention has been paid to the comfort of passengers and the seating has been designed to give the maximum ease for sitting by day and, at the same time ample width for sleeping at night. The seats in both classes are mounted on roller bearings and are exceptionally easy to pull out to give the extra width for lying down. The squabs fall away as the seats are drawn out, making more room at the back. Removable footrests, which stow away in cupboards in the corners of the compartments, and folding armrests are provided in the first class. The upper berths, folding against the partitions when not required, are each provided with a ladder pivoted near one end of the bunk. When required, these ladders can be swung down to the floor, and in the daytime, they remain along the edge of the folded berth.

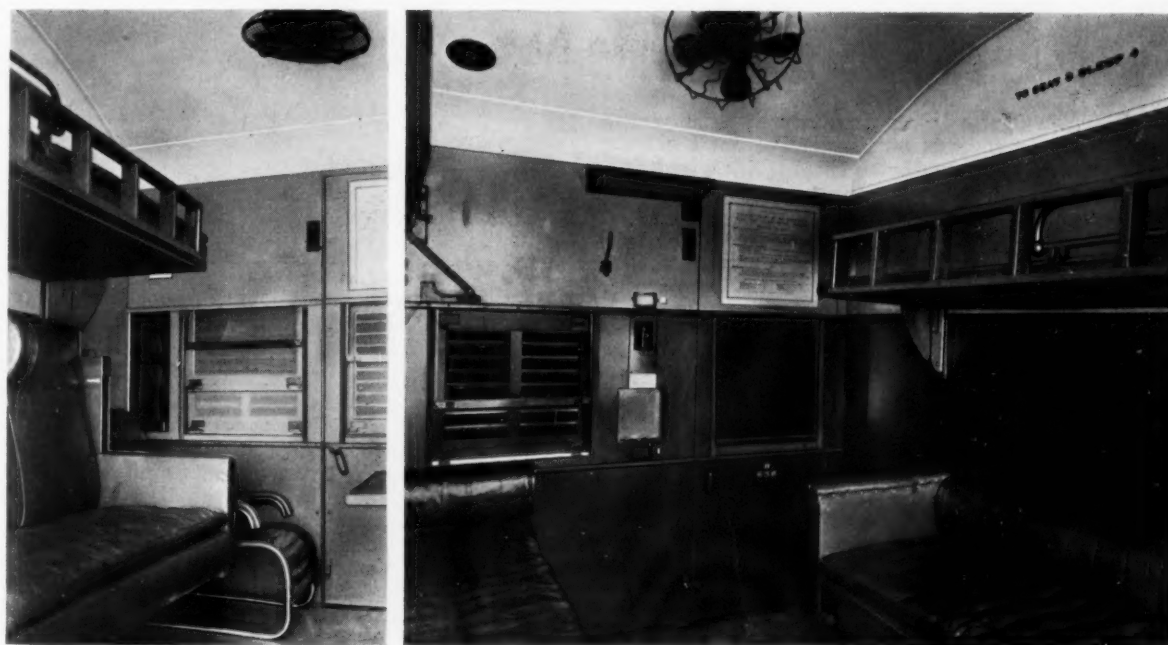
The seats are supported on brackets, and there are no supports along the front edge to interfere with the stowing of luggage underneath. Much thought has been given to this feature and there is sufficient space available for a good sized cabin trunk. Separate armchairs are provided in the coupes. These are of two varieties. Some



Seating and sleeping diagram or floor plan of one of the coaches



One of the larger first class compartments; left: upper berth lowered for use and ladder along edge of bunk; right: showing folding-table, racks for bottles and glasses and flush mirror in panelling, also ladder in use and foot rests stored in corner



Left: First class coupe with chromium plated chair. Right: Smaller second class compartment also complete with ladder and convenient fittings

NEW UPPER CLASS COMPOSITE COACHES, N.W.R., INDIA

have sliding cane seats and others are of chromium-plated tubular construction with hide seats and backs.

Fly-netting, venetians, and Beclawat sliding windows are fitted throughout. The fitting of Beclawat glass frames has been done to exclude the dust which is so often the bugbear of travel in India. Folding flap tables are provided in the first class, and, in the larger compartments, these are made to swing round towards the seat. There are also racks for bottles and glasses, and places for passengers to put their papers and books. Flush mirrors are let into the panelling.

The lavatories are panelled with Masonite Temper Tile, white enamelled with a black dado at the bottom. The flooring is mosaic supplied by the Oxy-Chloride Flooring Products Limited. There is a triangular corner cupboard with a mirror in each lavatory. Levick's triangular

porcelain washbasins are provided in the first class, and there are Levick tip-up German-silver wash-basins in the second. The closet flushing arrangements are by Curtis & Co., Bombay, whose V.M.C. flusher valves do away with the necessity of cisterns. These mushroom valves permit a discharge of one gallon, after which the valve drops and the flusher is immediately ready for the next discharge.

The electric lighting and fans are by J. Stone & Co. Ltd. In the first class compartments the roof lighting is recessed in the cone boards. Bulkhead lamps are fitted above the arm-rests. There is one fan for every passenger at night.

The bodies of these new coaches are mounted on standard I.R.S. 68-ft. long underframes. The tare weight is 46½ tons.

A NEW PRESSURE AND VACUUM CLEANING PLANT

Known as the Centric, this apparatus incorporates several original and interesting features

THE illustration reproduced herewith shows the Centric industrial pressure- and vacuum-cleaning plant, which has been specially designed to function with equal efficiency as a vacuum- or pressure-cleaning unit and may be used for either purpose by modifying the control valve through half a turn. The ball-bearing compressor is direct-coupled to a three-phase high-speed motor. Lubrication is entirely automatic, and as the motor bearings are packed with grease they require no attention, whilst the compressor is lubricated from a small auxiliary oil tank. The whole plant is totally enclosed and mounted on a tubular chassis running on roller-bearing cushion-tired wheels, thus allowing the unit to be moved to what otherwise would be inaccessible positions. The degree of vacuum obtainable is comparatively high, as with a closed orifice a vacuum of 6-in. mercury column, or over 80-in. water column, may be obtained. When used as a blower unit, pressures up to 10 lb. per sq. in. are obtainable, depending upon the size of the discharge nozzle in use.

Mobile vacuum-cleaning plants of this description have a considerable sphere of application on railways, especially in carriage and wagon building and repair shops, where the cleaning and restoring of upholstery is carried out on a very large scale. In addition, such a plant would be of considerable service in railway hotels and other buildings. The Centric unit represents an entirely new design, incorporating principles not hitherto applied for this particular work. There are several patented features, and the unit has the advantage of being light and easily manoeuvred and has proved highly efficient. The filters usually employed to protect the exhausters in many types of plant are dispensed with in this design and a positive displacement compressor replaces the usual centrifugal exhauster frequently used in units of this description. The air flow from the pick-up nozzle in the receiving cylinder is direct and uninterrupted, and therefore the disadvantages due to interposing the filters and exhausters are entirely eliminated. In these circumstances it is impossible for any dust or foreign matter to pass into the compressor, so that the plant may be regarded as offering ideal conditions for extracting abrasive material which



Rubber-tyred wheels running in roller bearings make it easy to propel the Centric into otherwise inaccessible positions

would be injurious to the ordinary type of extraction plant. No primary filters are required, and the secondary filter forms the dust receiver; it is of very large capacity, thus obviating the necessity of frequent stoppages for emptying. The total volume of clean air passed through the secondary filter is directed through a suitable cowling over the compressor motor for extra cooling.

A point worthy of notice is that the over-all dimensions and weight of the Centric plant in any of its sizes are much less for a given handling capacity than those usually met with, and the advantages of having available, without changing any pipe or other connections, either a high vacuum or a powerful air pressure jet, render the Centric adaptable for every requirement, as dust and foreign matter can be removed with ease even when working in the most inaccessible positions. The plant is manufactured by Dilworth & Carr Limited, of Preston, Lancs.

RAILWAY NEWS SECTION

PERSONAL

G.W.R. APPOINTMENTS

The following appointments, to take effect from July 24, are announced by the Great Western Railway:—

Mr. W. N. Pellow, Divisional Locomotive Superintendent, Bristol, to be Divisional Locomotive Superintendent, Old Oak Common.

Mr. C. L. Simpson, Assistant to Locomotive Running Superintendent and Outdoor Assistant to Chief Mechanical Engineer, Swindon, to be Divisional Locomotive Superintendent, Bristol.

Mr. H. G. Kerry, Assistant Divisional Locomotive Superintendent, Old Oak Common, to be Assistant to Locomotive Running Superintendent and Outdoor Assistant to Chief Mechanical Engineer, Swindon.

Mr. L. G. Morris, Assistant to Divisional Locomotive Superintendent, Newton Abbot, to be Assistant Divisional Locomotive Superintendent, Old Oak Common, London.

Sir Herbert Walker, who retired in 1937 from the general managership of the Southern Railway, has resigned from his position of Vice-President of the board of management of the International Union of Railways, in which capacity he had represented the British railways since 1924.

Mr. Gilbert S. Szlumper, the present General Manager of the Southern Railway, has succeeded Sir Herbert Walker as Vice-President representing the British railways on the board of management.

Dr. C. G. Booker, Railway Health Officer, General Manager's Department, South African Railways & Harbours, has been appointed a Deputy Chief Health Officer for the Union, Department of Public Health.

INDIAN RAILWAY STAFF CHANGES

Mr. A. C. Griffin, O.B.E., has been confirmed as Secretary, Railway Board.

Khan Bahadur Muzaffar Hassain has been confirmed as Director, Establishment, Railway Board.

Mr. A. C. Vining, Officiating Deputy Chief Operating Superintendent, N.W.R., has been granted four months' leave, as from June 1.

Mr. A. K. Muirhead, Controller of Stores, N.W.R., has been granted leave for four months as from June 1.

Mr. B. Moody, V.D., Chief Operating Superintendent, N.W.R., has been granted four months' leave as from June 2.

Mr. R. Proudlock has been appointed to officiate as Deputy Chief Commercial Manager, N.W.R., *vice* Mr. V. O. Raynor, proceeding on leave.

Mr. A. V. Mason has retired from the position of Engineer (Trams & Trolleybuses), London Passenger Transport Board, and has been succeeded by Mr. G. F. Sinclair, formerly Rolling Stock Engineer (Trams and Trolleybuses). Mr. Mason was educated at Sherborne School, and was a pupil at the Brush Company's works at Loughborough. In 1898 he was appointed Power-House Foreman, or Resident Engineer, at Kidderminster. After a brief time at Hartlepool he went to



Mr. A. V. Mason

Engineer (Trams and Trolleybuses),
London Transport, 1933-39

British Columbia as Secretary-Accountant and Manager to the tramway system in the town of Nelson. He came back to this country to superintend the laying of tram track at Belfast, and was afterwards Manager of the tramways at Devonport. In 1908 Mr. Mason was appointed Manager of the South Metropolitan Electric Tramways & Lighting Company, which ran trams in Croydon and supplied light to Sutton. Ten years later he was made Chief Engineer of the three tramway companies included in the Underground group—the Metropolitan Electric Tramways, London United Tramways, and South Metropolitan Electric Tramways. When the London Passenger Transport Board was set up in 1933, he was appointed to the position from which he has now retired. Mr. Mason was responsible for the running of the first trolleybus service in London—between Twickenham and Teddington—in May, 1931.

Mr. G. F. Sinclair, M.I.E.E., A.M.I., who succeeds Mr. Mason, was trained with Dick, Kerr & Company, and was subsequently employed as Technical

Assistant, English Electric Co. Ltd.; General Manager, Kilmarnock Engineering Company; and Rolling Stock Engineer, L.C.C. Tramways. He was appointed Rolling Stock Engineer (Trams & Trolleybuses), when the London Passenger Transport Board was formed in 1933.

Mr. H. P. Renwick, M.I.Loco.E., Deputy Transportation Superintendent (Power), Great Indian Peninsula Railway, has been appointed Chief Mechanical Engineer of that railway as from May 13. Mr. Renwick was trained at the Battersea works of the former S.E. & C.R. from January, 1905, to February, 1912. From March to August, 1912, he was attached to the Tonbridge locomotive shed for experience in firing and running shed management. In August, 1912, on the recommendation of Messrs. Sir A. M. Rendel & Robertson, Consulting Engineers, he was appointed Assistant Locomotive & Carriage Superintendent on H.E.H. The Nizam's Guaranteed State Railways (now the Nizam's State Railway). In March, 1914, he was promoted to district rank and given charge of the metre-gauge section of that railway. In August, 1920, Mr. Renwick's services were transferred to the Great Indian Peninsula Railway, by which railway he was appointed District Locomotive Superintendent, Konkan District. In November, 1922, Mr. Renwick was transferred to the Transportation Department of the G.I.P.R. as Assistant Transportation Superintendent, and from that date until March, 1933, he worked on the Jhansi, Sholapur, Jubbulpore, Bhusawal, and Bombay divisions. For short periods in 1928-9 and 1929-30, he was appointed Officer-in-Charge, Aden Railways, and from July to August, 1929, he officiated as Deputy Transportation Superintendent (Carriage). Mr. Renwick officiated as Divisional Transportation Superintendent, Bhusawal, in 1933; as Deputy Transportation Superintendent, Power, from 1933 to 1936; and was confirmed in the latter appointment on October 16, 1936. He was appointed Chief Mechanical Engineer on May 13 of the present year on the retirement of Mr. C. F. White.

Captain F. H. H. Thomas, O.B.E., T.D., who since March, 1929, had been in charge of the Secretary's Records Office, Marylebone, L.N.E.R., retired on June 23, after 47 years' service. Captain Thomas joined the former Great Eastern Railway in 1892, and after three years in the Registration Office was transferred to the Secretary's General Office. In 1913 he was placed in charge of the Minutes Section of the office, and on amalgamation in 1923



Arrival of official train at Rochester station on June 30, inaugurating the Southern Railway electrification to Maidstone, Strood, Rochester, Chatham, and Gillingham. The Mayor of Rochester is greeting the driver



Left : Mr. Gilbert S. Szlumper, General Manager of the Southern Railway, at Waterloo inspecting members of the company's staff who have been trained in A.R.P.; and (right) inside the lecture-car of the new Southern Railway A.R.P. instructional train (see article opposite)

transferred to the L.N.E.R. Secretary's Office at Marylebone. He succeeded Mr. G. J. Hyde as head of the Records Office on Mr. Hyde's retirement in 1929. Captain Thomas was one of the founders of the Great Eastern Railway Swimming and Athletic Associations and for some years was Chairman of the latter; he assisted in the formation of the London Railways' Athletic Association in 1907, and was largely responsible in 1919 for inaugurating the G.E.R. Old Comrades' Association and the G.E.R. Distress Fund. Captain Thomas held the office of Hon. Treasurer of the L.N.E.R. Musical Society from 1922, and was a Vice-President of the society. He was also Honorary Secretary and Treasurer of the L.N.E.R. (Southern Area) Golfing Society.

Mr. H. Bissel, Continental Manager of J. Stone & Co. Ltd., has been invested by the President of the French Republic with the order of the Legion of Honour.

Mr. Stamford E. McLewin, who for 37 years has been Honorary Secretary of the Permanent Way Institution, has decided to retire at the end of the present year.

We regret to record the death on July 3 of Mr. Herbert Rhys Price, General Manager of the former Brecon & Merthyr Railway from 1903-1922. Mr. Price joined the service of that company as a boy clerk in 1875, and subsequently occupied the posts of Registrar, and Secretary. From 1903 to 1916 Mr. Price combined the posts of Secretary and General Manager.

We regret to record the death on July 3 of Lord Mount Temple, who, as the Rt. Hon. Wilfrid Ashley, was Minister of Transport from 1924 to 1929. The Rt. Hon. Wilfrid William Ashley was born in 1867, and educated at Harrow and Oxford. After leaving the University he had 17 years' military service, retiring in 1903. On the outbreak of war he rejoined the Army and was appointed to the command of the 20th Battalion. He had entered politics in 1906 as Member for the Blackpool Division of Lancashire. Subsequently he represented the Division of Fylde, and the New Forest and Christchurch Division of Hampshire. In 1922 he was appointed Parliamentary Secretary to the Minister of Transport, but was later transferred to the War Office as Under-Secretary. On the accession of Lord (then Mr.) Baldwin's Government in 1924, he was appointed Minister of Transport, and served as such throughout the term of that administration. His work at the Ministry was largely concerned with legislation for road construction and improvement, and the extension of cheap electricity to rural areas. He was raised to the peerage in 1932.

A.R.P. Instruction Train, Southern Railway

Two-coach train, providing lecture room, gas chamber, and accommodation for travelling instructional staff

Instruction in Air Raid Precautions to Southern Railway staff outside London is to be given from a special two-coach train that has been fitted up as a lecture room (with gas chamber adjoining), and living quarters for two travelling instructors. Seating in the van which forms the lecture room consists of light tubular steel chairs that can be stacked together in a very small space, leaving the floor clear for practical exercises. Suitable labelling divides the floor into the various sections that would be found in a decontamination station, so that workers can familiarise themselves with the performance of these operations in their proper sequence. Lectures are supplemented by an A.R.P. booklet issued by the company, containing not only the usual notes on gases and gas drill but special remarks applicable to the decontamination of railway vehicles and equipment.

The instructional syllabus covered on the train takes three days, at the end of which there is an examination. As staff of all grades are to be trained, the examination papers are framed to minimise the amount of writing required to answer the questions. In most cases an

affirmative or negative suffices, or the simple selection of the correct course to be pursued from a list of possibilities. Three practical tests are also given. Instructors on the train have an office, stores, and facilities for repairs to equipment.

On June 29 the train was exhibited at Waterloo station, headed by a "King Arthur" class locomotive equipped with cab screens for blacking-out the glare from the firebox at night. The train is painted bright yellow externally, with the slogan "We've got to be prepared" in red, white, and black. Detachments of railwaymen trained in various branches of A.R.P. paraded on the platform wearing protective clothing and respirators. Instruction in securing protection against aerial attack has already been given to 15,000 men by 68 men of the Southern Railway, who have been trained and become qualified lecturers. The official Home Office badge for proficiency in decontamination, fire-fighting, and demolition work is held by 1,300 men. The A.R.P. train will later begin its instructional tour with the Kent and Sussex Coasts, and then go to the West of England.

L.M.S.R. Motive Power League

At the fourth annual presentation of shields to the winning districts in the L.M.S.R. Motive Power League (for the reduction of engine casualties), held at the Euston Hotel on June 28, reference was made by Mr. T. W. Royle, the Chief Operating Manager, to several records which had been attained during 1938. The past year had produced the highest miles per casualty figure; in the last four weeks the debitable engine casualties amounted only to 202, the lowest on record; Plaistow District had achieved a splendid hat-trick by winning first place in the last three years' competitions, their aggregate points being the greatest so far; and the struggle among the districts in the centre of the league had been more intensive than ever before. Reviewing the progress made over the past four years, Mr. Royle stated that out of a total of 29 districts 18 had won a shield on at least one occasion; five had gained a place each year, two on three occasions, three on two occasions, and eight on one. The miles per casualty had increased by 60 per cent.

Lord Stamp, the Chairman of the L.M.S.R., in presenting the awards, said that the competitions did not lose interest as the years went by, but that with the remarkable improvement shown it was going to be more and more difficult to improve and he jocularly visualised the time when there would

be no casualties at all. He referred to visits paid to this country by railway experts from abroad, who studied our methods of working and stressed the point that we in turn may learn from them. He did not see that with the marvellous results attained there was any likelihood of the enthusiasm fading and he congratulated all concerned on the sustained improvements.

Mr. Ashton Davies (Acting Vice-President) and Mr. D. C. Urie (Superintendent of Motive Power) also spoke; the latter called attention to the fact that out of between 80,000 and 90,000 locomotive axle bearings in use every day, only seven a day gave trouble by overheating. Others present at the gathering included Sir William Wood (Vice-President) and directors and chief officers of the company. The shield-winning districts were placed as follows:—

1. Plaistow (Mr. J. E. Wood).
2. Bristol (Mr. Bramley, for Mr. A. H. Whitaker, who was indisposed).
3. Shrewsbury (Mr. W. H. Ensor).
4. Bescot (Mr. H. Hughes).
5. Derby (winner of a shield on four occasions, Mr. H. B. Buckle).
6. Motherwell (Mr. H. G. Prentice).
7. Carnforth (Mr. J. Briggs).
8. Wellingborough (Mr. E. M. Ambler, coupled with Mr. Mercer, who was in charge during most of the year under review).
9. Bank Hall (Mr. S. T. Clayton).
10. Crewe (Mr. W. E. Blakesley).

Official Opening of Medway Electrification, S.R.

Minister of Transport present at inaugural ceremonies

To inaugurate the Medway electrification of the Southern Railway, described in our Supplement last week, a special train of the new electric stock, with officials of the Southern Railway and their guests, was run last Friday from London to Maidstone, Rochester, Chatham, and Gillingham, where it was welcomed by the Mayors of those places.

Mr. Gilbert S. Szlumper, General Manager, Southern Railway, proposed the toast of "The Guests" at a luncheon in Chatham Town Hall, and spoke of the assistance received by the Southern Railway from the Government, through the Minister of Transport, for the undertaking of the various electrification schemes, of which the present was the culmination.

Captain Euan Wallace, Minister of Transport, responding, said that the Southern Railway electrification was one of those examples of co-operation between private enterprise and the State which had become fairly common since the war and seemed likely to multiply in future. He referred to the interest of the whole railway world in the recommendations made by the Transport Advisory Council in its report on the "square deal," and mentioned that although the Government had accepted these proposals in principle, the preparation of appropriate

legislation was so complicated a matter that it was bound to take time. He was glad, however, that the road and rail interests were not waiting for an Act of Parliament, for a Road-Rail Conference was already engaged in considering the possibility of a common classification of goods for both road and rail rates and the adoption of uniform conditions of carriage. A good omen was that the names of the leading personalities on each side differed only by a single letter.

Referring to the importance of the railways, the Minister spoke of the comprehensive measures planned for their control and protection in case of war. As an indication of how well advanced protective preparations already were, he mentioned that out of a total expenditure of £4,000,000 to be financed by the Government for precautions to be taken, already over £3,000,000 had been sanctioned.

Councillor J. T. Hawes, Mayor of Chatham, proposed the success of the S.R. electrification to Maidstone and the Medway towns, and paid a special tribute to the consideration with which, in his experience, travellers on the Southern Railway were always treated by the staff.

Mr. R. Holland-Martin, Chairman of the Southern Railway, responding, said that it was a cardinal principle of all

members of his company's staff to aim at providing the best possible for its patrons, and he was glad to have such a spontaneous tribute as that paid by the Mayor of Chatham.

Among those at the luncheon were:—

Sir Leonard Browett (*Permanent Secretary to Minister of Transport*), Messrs. E. C. Cox, G. F. Frouch (*General Manager, Maidstone & District Motor Services*), P. E. Graefe (*Secretary and Commercial Manager, Maidstone & District Motor Services*), R. H. Hepburn (*Secretary, Tilling Stevens*), J. R. Hind (*British Railway Press Officer*), Sir Charles Igglesden, Col. A. H. L. Mount (*Ministry of Transport*), Messrs. D. F. O'Neill (*Principal Private Secretary to Minister of Transport*), V. Overgaard (*Asca Electric Limited*), T. H. Rowe (*Controller, Frederick Hotels*), C. Sheath, J. P. Thomas, T. E. Thomas (*General Manager, L.P.T.B.*), Captain Euan Wallace (*Minister of Transport*), and the following members of the Southern Railway: Messrs. O. V. Bulleid (*Chief Mechanical Engineer*), H. W. Corry (*Director*), Sir George L. Courthope (*Director*), Messrs. R. G. Davidson (*Joint Accountant*), L. F. S. Daves (*Secretary*), G. Elson (*Chief Engineer*), A. Endicott (*Surveyor and Estate Agent*), W. J. England (*Assistant Superintendent of Operation*), F. Gilbert (*General Assistant, Publicity*), C. Grasemann (*Public Relations and Advertising Officer*), R. Holland-Martin (*Chairman*), E. J. Missenden (*Traffic Manager*), W. C. Moore (*Chief Assistant to Electrical Engineer*), P. Nunn (*London East Divisional Superintendent*), W. M. Perts (*Commercial Superintendent*), Lt.-Col. H. C. Prescott (*Chief of Police*), the Earl of Radnor (*Director*), Messrs. R. M. T. Richards (*Assistant Traffic Manager*), H. E. Roberts (*Eastern Divisional Engineer*), Lord Rockley (*Director*), Messrs. S. W. Smart (*Assistant for Train Services*), G. S. Szlumper (*General Manager*), Sir Herbert Walker (*Director*), Messrs. G. R. Walter (*Public Relations Assistant*), and H. E. O. Wheeler (*Superintendent of Operation*).

The complete new electric services came into public operation on Sunday, July 2.

Permanent Way Institution Summer Convention

The annual summer convention of the Permanent Way Institution was held this year from July 1 to 6, with Hull as its centre, and under the presidency of Mr. F. E. Harrison, Engineer, North Eastern Area, L.N.E.R. Among those who took part in the convention were the following:—

Messrs. T. N. B. Bates, T. D. Bannister, M. F. Barbey, D. R. Bennett, K. Brown, R. G. Booth, W. Bygott, R. Carpmal, N. Clougher, Major Carver, Messrs. N. Davis, R. E. Doré, A. W. M. Dyke, F. Everitt, J. A. Feighan, W. A. Fraser, H. R. Garth, R. W. Gairns, C. W. Gibson, G. D. Greig, G. Hare, H. Janes, R. V. Hughes, W. D. Johns, J. H. Knotts, W. G. Latham, F. Lawson, A. H. McMurdo, J. H. McIlvenna, S. E. McLewin, K. C. Marrian, B. Middleton, R. Mitchell, C. F. Minett, B. Mulliner, H. Ormiston, F. L. Pawley, H. M. Pearson, J. Restrict, J. Ratter, Lord Ridley, Messrs. F. E. Sager, F. R. Shulter, D. D. Shaw, M. G. R. Smith, L. Taylor, C. F. Tofts, J. Taylor Thompson, T. H. Turner, E. H. Tustain, E. V. Taylor, W. K. Wallace, D. Williams, W. A. Willox, A. Wynn-Williams, and L. Wynn-Williams.

The Lord Mayor of Hull, officially welcomed the members, and after the formal business of the summer general meeting, held on Saturday, July 1, at which it was decided to send a message of greeting to Dr. Remy, President of the Cologne Division of the German State Railway, in commemoration of the successful convention there last summer, an entertaining and instructive lecture was given by Mr. T. Sheppard on the history and anti-

quities of Hull. In the evening the annual summer dinner took place at the Royal Station Hotel.

Mr. C. M. Jenkin Jones, General Manager, North Eastern Area, L.N.E.R., proposed the toast of "The City of Hull," the third port in the Kingdom, and mentioned that the city's prosperity was due to the development of many industries based on the Mercantile Marine. He had come to Hull 30 years ago and congratulated the Lord Mayor, Alderman William Pashby, a fellow railwayman, on his high office and on the enterprise of the municipality in the progressive development which it had sponsored.

The Lord Mayor, responding, stated that Hull was distinguished not only as being the third port in the Kingdom, but as being the cheapest. It was the gateway of the Midlands, and nine million people might be said to depend for their supplies upon Hull. Such a centre of distribution required the co-operation of rail and sea, and much of the present importance of Hull was due to the railways.

Major W. H. Carver, M.P., Director, L.N.E.R., proposed the toast of "The Permanent Way Institution" and paid a tribute to the railway engineering staffs on whose skill and conscientious work depended the success of the modern high-speed train.

Mr. F. E. Harrison, in replying, said that the P.W.I. was founded 55 years ago and now had 3,000 members. That its usefulness was being appreciated by those for whom it existed might be gathered by the fact that the numbers had doubled in the last ten years. Mr. Harrison announced that Mr. S. E. McLewin, who had acted as Secretary for 37 years, had decided to retire at the end of the year, and would be greatly missed.

Mr. Frank Colebrook, District Engineer, York, L.N.E.R., proposed the toast of "The Guests," and Mr. Tom Hudson, representing the fishing industry of Hull, responded.

On Sunday morning the members were conveyed by special train to Carlton Towers on the old Hull & Barnsley line, to witness demonstrations of relaying with steam cranes and with the Morris track layer. Both processes were demonstrated in full, and in addition a demonstration of the use of the ballast-edge plough was given. The last-mentioned was illustrated and described in THE RAILWAY GAZETTE of July 17, 1936, relaying by means of cranes was described in the issue of July 1, 1934, and the Morris track layer in the issue of April 4, 1930. Numerous visits were made to industries and places of interest in the neighbourhood, and an enjoyable trip by special observation car train was made on Wednesday by way of Malton, Pickering, and the Yorkshire Moors, and back *via* Scarborough.

MINISTRY OF TRANSPORT ACCIDENT REPORT

Hatfield, L.N.E.R.: January 26, 1939

At about 10.9 a.m. the 7.15 a.m. passenger train from Peterborough (No. 269), consisting of four twin articulated coaches and van drawn by 2-6-2 engine No. 4813, collided at an estimated speed of 30 to 35 m.p.h. with the 8.35 a.m. train from Cambridge (No. 250) on the up main line, driving it into collision with the 7.34 a.m. train from Cambridge (No. 238) and causing considerable damage. One passenger was killed, 27 passengers and a driver suffered minor injuries or shock, and 23 further passengers complained later that they did so. The tail of train No. 250 was just under an overbridge and the rear of two goods trains standing on an adjacent line restricted sight of it until within 240 yd. Block telegraph and telephone communication between Hatfield and Welwyn Garden City, the next station to the north, failed at 6.30 p.m. the previous day, due to heavy snowfall; trains were being worked through the section on the "time interval" system under emergency regulations. Main-line traffic had been seriously hampered for some hours. Visibility had become quite good by the time of the accident, snow ceasing some hours previously, and evidence showed that neither the rear face of the overbridge nor the rear end of train No. 250 was coated with snow. Lt.-Colonel E. Woodhouse conducted the official inquiry.

Signalman A. F. Searle, Hatfield No. 2 box, said that owing to delays and traffic difficulties there had been one or more trains outside his home signals for varying periods since he had come on duty, with no flagman protecting the rear. The procedure to be adopted under complete breakdown of means of communication is laid down in Block Telegraph Regulation 25, portions bearing on this accident reading as follow:—

FAILURE OF INSTRUMENTS, BELLS, OR GONGS.—In the event of any failure of the block instruments, bells, or gongs, so that the necessary signals cannot be forwarded and received in the ordinary way, the following instructions must be observed:—

(a) (i) . . . A train must not in any circumstances be allowed to pass a signal box into that section of the line where the failure exists without being previously brought to a stand, and the driver and rear guard, also the driver of an engine assisting in the rear, if any, advised of the failure. The driver or drivers must, in addition, be instructed to proceed cautiously through the section.

(a) (ii). (a) (iii) [These lay down the procedure to be followed when verbal communication is possible between boxes, by telephone or signal needle telegraph, although the block instruments which give a visual reminder of the last message sent, and their bells, have failed.]

(a) (iv) When the bells or gongs have failed, and speaking instruments are not

available, a train must not be allowed to follow another train until the time usually taken by the preceding train to clear the section, after allowing for the train having been stopped, has elapsed, but in no case with a less interval than three minutes. When a tunnel intervenes in a block section an interval of not less than ten minutes must be allowed between two trains, unless the signalman can satisfy himself that the tunnel is clear.

(g) When trains are being worked in accordance with clause (a), paragraph (iv), all trains must be brought within the protection of the home signal as promptly as possible, and to obviate a train standing with its rear portion outside the home signal, the signalman must, if necessary, authorise the driver to draw forward a sufficient distance to bring the rear portion within the home signal.

If a train requires to stand outside a home signal for the purpose of attaching or detaching traffic, or through any other cause, the signalman must obtain the assistance of a hand-signalman provided with the necessary detonators and hand signals, who must be sent out a sufficient distance from the rear of the train to afford protection. Until this hand-signalman has been provided, a train must not be stopped outside the home signal to attach or detach traffic.

When a train is deprived of the protection of the block system in such circumstances, special precautions against an overtaking collision have to be taken. These are set forth in General Rule 55A, incorporated in the Rule Book on January 1 last, and in Rule 178. Rule 55A lays down that:—

On lines used by passenger trains, when trainmen have been advised by the signalman that the block apparatus has failed and trains are being worked on the time interval system (*i.e.*, there is no bell or speaking communication with the signal box ahead) . . . the following instructions must be carried out:—

(a) . . .

(b) During fog or falling snow, should a train be detained owing to the outermost home signal being at danger, the guard must immediately apply the brake and go back not less than 100 yards in rear of his train and protect it by placing one detonator on the rail. After doing so he must at once rejoin his train . . .

If a train is brought to a stand behind another train in the section, the rearmost train must be protected as previously described. . . .

(c) It will not be necessary for the guard, fireman, or shunter, as the case may be, to protect his train as prescribed in clause (b) in the following circumstances:—

(i) If a Hand-signalman is on duty and the trainman concerned is satisfied that he is protecting the train.

(d) To enable the provisions of clauses (a) and (b) to be carried out, the signalman must in addition to advising the trainmen of the block failure also inform them that there is no communication with the signal box ahead.

Rule 178 which deals with the pro-

cedure to be followed when a train is stopped by "accident, failure, obstruction, or other exceptional cause" instructs the guard and fireman to proceed towards each other to ascertain if the opposite line is obstructed and in order that the fireman may convey to the guard the driver's request for any assistance that may be needed, directing that:—

The guard must also proceed along the same side [*i.e.*, the off side] of the train towards the fireman to confer with him, and must then protect the train in the rear in accordance with Rule 179, except that should the guard have been advised or be aware that the block apparatus has failed he must, after satisfying himself that no line used by trains running in the opposite or in the same direction is obstructed, *at once* go back and protect his train.

(The words printed in italics above are not so printed in the actual rule book.)

When the accident happened there were four trains standing outside the up main home signal, Nos. 219, 146, 238, and 250. Signalman G. H. Bruton was on duty at Welwyn Garden City, the next box in rear and Porter A. Jakes, properly instructed by him, was warning those in charge of up trains that all communication with Hatfield had failed. Jakes was certain that he warned every driver, trains being despatched at 10 min. intervals, including the driver of No. 269, the colliding train, but was unable to warn all the guards, as some were not looking out. He did not manage to speak to the guard of No. 269. Bruton, who had done warning duty previously, confirmed these conditions. Driver Fiske, of train No. 250, properly warned by Jakes, ran forward cautiously, stopped some little distance behind No. 238, drew closer, then sent his fireman, W. E. G. Barham, back to see if his guard, H. Driver, was protecting the train. Barham met Driver at his van. A train was heard starting and later No. 269 was seen approaching faster than they had done. They ran towards it and Driver, with a red flag, succeeded at some risk in fixing a detonator, the remains of which were found 125 yd. north of the bridge. Driver was not fully aware that the block had broken down, but heard someone call out at Welwyn Garden City, "They are still running at caution."

W. H. Merchant, driver of No. 269, said it was his first experience of time interval working due to block failure. Jakes made it clear to him that block working was suspended and communication with Hatfield totally interrupted. He would not admit that his speed rose above 20 to 25 m.p.h. He thought he was 230 yd. from train No. 250 when he saw Barham signalling to him, when he braked, applied sand and reversed. He agreed that visibility was good. He did not expect to find so long a string of trains in the section. The end of No. 250 was not difficult to see, but he did not notice it until he exploded the detona-

tor. He thought speed was reduced to 5 to 10 m.p.h. and would not modify his estimate, although the damage done was pointed out to him. His fireman, A. W. Chambers, was not then firing, but did not look out or see Barham's signals. He understood Jakes's warning, but did not hear the detonator. He supported Merchant's estimate of the speed. The guard was unaware that the block had failed.

The Inspecting Officer's Conclusions

Merchant's statement about his speed cannot be correct, otherwise he would have been able to stop clear of train No 250 and the result of the collision would have been very trifling. It is clear that the impact was of great violence and the wreckage suggests that the speed was some 30 to 35 m.p.h. at the time of the collision. Merchant must have been travelling about 40 to 45 m.p.h., wholly inconsistent with the warning he had received. Possibly his serious under-estimate was due to the class of engine he was driving, capable of rapid acceleration with such a light train, attaining a relatively high speed with deceptive absence of vibration and noise, but the true explanation is thought to be that Merchant was surprised to find the stationary trains extending so far back from the home signal. Properly warned, he was not running with the care demanded and responsibility rests mainly on him. He is 63, with 45 years' service, 21 as driver, with a good record. His serious lapse was the cause of the accident but might have been prevented, however, if a hand-signalman had been appointed to protect trains detained outside the home signal in accordance with the regulation quoted above, moving out further with every successive train. No blame attaches to Guard Driver. It was not snowing and he was under no obligation to take special measures. He and Barham are to be commended for their alertness.

Remarks and Recommendations

Improvement is needed in the arrangements for informing guards that block apparatus and other means of communication have failed and time-interval working been substituted. Bruton and Jakes were unable to warn the guards of several trains; those of trains 238 and 250, unlike the drivers, had no warning at boxes further north. A guard unaware that his train is running without the protection of the block system is unlikely, when it comes to a stand, to take the *immediate* action to protect it demanded by Rules 55A and 178; for this reason Block Telegraph Regulation 25 directs that rear guards as well as drivers are to be advised of block apparatus failure, and that Rule 55A lays down that they are to be informed if all communication is interrupted.

Conditions at Welwyn Garden City

necessitated appointing a man specially conveying this warning, but in most cases the notification has to be communicated to trainmen by the signalman. Though it can be given without difficulty to trains brought to a stand at the box, its transmission to passing guards is by no means easy. While not bearing on the present accident, this is of considerable importance; the companies should be asked to consider a practical solution of the difficulty.

Several contingencies other than block failure necessitate a verbal warning from signalmen to drivers; such as animals on the line, or a train in the opposite direction an unusually long time in section. Stoppage at a signal box for this purpose will not necessarily indicate to its guard that complete block failure has occurred placing special responsibilities upon him.

The L.N.E.R.'s officers did not regard the failure to appoint a hand-signalman, or flagman, to protect trains waiting at the Hatfield up home signals as an infraction of Block Telegraph Regulation 25 (g); the purpose of the second paragraph thereof was mainly to ensure protection for a train standing outside a home signal while vehicles were attached or detached, an operation with which the guard might have to concern himself. Were this so, it seems that the words "or through any other cause" ought to be deleted, for they make it applicable to trains detained in the circumstances of this accident. This interpretation appears open to question. The block system is the normal protection against an overtaking collision; rules and regulations governing train movement prescribe supplementary safeguards as a precaution against error or forgetfulness. Local protection in rear of a train unexpectedly stopped in mid-section has to be provided by the guard, and if a train is unduly detained at a signal a reminder of its presence is given to the signalman by one of the trainmen, unless apparatus has been installed to relieve them of this duty; in both cases safeguarding against erroneous acceptance of a following train.

If total breakdown renders the block system inoperative, the warning to drivers to run cautiously is the main precaution taken. The instruction in Block Telegraph Regulation 25 (g) that waiting trains are to be brought within the protection of the home signal, if possible, is a further safeguard, of value if the driver of a following train is less alert than he should be or running too fast to stop at an unexpected place. The additional instruction that a flagman is to be employed to perform the same function as the home signal, at a suitable distance in rear of trains which cannot be brought within it, is an obvious extension of the principle of providing a secondary safeguard. It seems illogical to make a

distinction in this respect between trains waiting to resume their journey and those which require to attach or detach vehicles. The words "or through any other cause" appear to have been included in Regulation 25 (g) deliberately, to cover conditions such as those existing before the present accident. Moreover, the reference to a hand-signalman in the recently introduced Rule 55A suggests that his presence is not to be regarded as exceptional in the circumstances envisaged by that Rule, that is to say when the block system is inoperative.

The wisdom of providing a supplementary safeguard against accidents, if reasonably practicable, needs no emphasis. It may be difficult to arrange for a flagman at the less important signal boxes, where detention of trains outside the home signal on occasions of complete block failure is unlikely to be either frequent or lengthy, but places (such as Hatfield) where there are junction connections which would be fouled by trains waiting within the protection of the home signal fall into a different category. There had been a succession of up trains waiting at the Hatfield home signals from 6.0 a.m. onwards, and the report on a minor accident which occurred there earlier shows that similar conditions had existed at about 3.45 a.m. The desirability of rear protection in such circumstances is also a matter which the companies should be asked to consider.

So widespread a breakdown of telegraph and telephone lines as occurred in this instance is happily rare. Serious delay and dislocation of traffic may result from damage on a much smaller scale. It is therefore appropriate to consider what precautions can be taken against total interruption of communication between signal boxes.

Questions of cost restrict the wholesale substitution of buried cable for overground lines. To enable block working to be maintained, in a modified form for which the procedure is laid down in the existing regulations, a telephone between signal boxes is sufficient, a single circuit, run in cable or underground to be immune from storm damage, would suffice and, being relatively short, satisfactory speech transmission should be obtainable from ordinary telephone instruments without special equipment.

While there may be no justification for such circuits in some localities, there is much to be said for their gradual provision where congestion may otherwise occur, such as on busy stretches of the line and the approaches to junctions or other points where trains may be kept waiting; sections where there are tunnels fall into the same category, for time-interval working through them is particularly undesirable. This matter also the companies should consider.

STAFF AND LABOUR MATTERS

Railway Shopmen

The Industrial Court has issued its award (No. 1,732) on the following claims submitted to it by the trade unions parties to the Railway Shopmen's National Council:—

(1) that the standard time rates of pay be increased by 2d. an hour;

(2) that the total of the standard time rate and war wage be in no case less than 50s. a week;

(3) that each employee be guaranteed (a) for each day he is available for duty a day's pay at standard time rate and war wage; and, (b) provided that he is available for duty throughout the week, a week's pay at standard time rate and war wage;

(4) that after twelve months' continuous service each employee be allowed twelve working days holiday per annum with pay at standard time rate and war wage.

The number of railway shopmen affected by the claim is about 92,300.

In support of the claims for increased wages it was submitted on behalf of the trade unions that since the present rates of wages and conditions of employment of railway shopmen came into operation in October, 1922, various changes had taken place in the organisation of the workshops and in the methods of production as a result of which output had been considerably increased relatively to the number of men employed. In this connection reference was made to the standardisation of component parts, the introduction of important changes in methods of work, such as paint sprayers, mechanical concrete mixers, riveting by automatic tools, air-driven pneumatic hammers, and electric welders. Increases in rates of wages had recently taken place in the engineering industry and it was submitted that the increased purchasing power of those engaged in the engineering industry had its effect upon others engaged in similar occupations in the railway shops and particularly in towns where the same classes of men reside and intermingle, and that in the circumstances there was justification for the application that some increase should be granted to railway shopmen. Reference was also made to the rates of wages in the engineering industry, the rates paid by Imperial Chemical Industries Limited, and to various trade board rates. It was stated that in most cases the trade board rates were in excess of the rate, plus bonus, of many railway shopmen.

The claim for a minimum of 50s. was based on the minimum of "human needs." It was made on the principle that such a rate should be the first consideration in any industry. Information had been obtained from men in various parts of the country as to their household budgets, details of which were submitted to the Court. In the case of men paid the lowest rates of wages, regard should be had to the

effect of short time on their earnings. Men should not be expected to rely upon overtime, night duty or Sunday duty payments in order to secure minimum human needs. It was stated that short-time working had been assumed as $4\frac{1}{2}$ hours' loss of pay each week, plus 8 days' loss on bank or public holidays and that in consequence a very large number of men whose base rates were 28s. a week plus 16s. 6d. drew only £1 17s. 8d. a week.

As regards the claims in respect of a guaranteed day and week, it was submitted that the principle is not a new one, so far as the railways are concerned, because it is in operation as regards what are known as the conciliation grades, and that the circumstances which permit of the operation of a guaranteed day and week on the traffic side appear to have some bearing on the railway shops side. The men engaged in the railway shops are at the disposal of the companies each day and throughout the week, are available if called upon to work on Sundays, and are accordingly entitled to have guaranteed to them a full week's pay involving a guaranteed day.

As regards the claim for twelve days' holiday, the general tendency in industry is now to give longer holidays than used to be the case and twelve days' holiday is not uncommon. Imperial Chemical Industries Limited, has an agreement providing for a week's holiday with pay, and payment for six bank or public holidays, and an agreement will shortly come into operation providing for six days plus six statutory holidays with pay in the flour milling trade. The work of the men concerned in the present claim warrants a longer holiday in which to recuperate, and it was submitted that an increase in the standard of physical fitness followed the allowance of holidays with pay, and that such holidays reacted advantageously to the benefit of the employer. It was submitted that the financial position of the companies showed signs of improvement, but that, in any case, in respect to all the claims now put forward, a full return to the workers must be the first call on the industry.

Companies' Reply to Claims

On behalf of the companies it was stated that the terms of Industrial Court Award No. 728, which came into operation in October, 1922, formed the accepted basis of employment of railway shopmen. The only changes in pay and conditions which had taken place since October, 1922, had been favourable to the railway shop staff. In the case of labourers the time rates of labourers fixed by Award No. 728 at 27s. and 28s. had been increased in August, 1937, to 28s. and 28s. 6d. respectively, and at the same time a week's holiday with

pay had been granted to all classes. As regards the claim for a general wage increase of 2d. an hour, it was pointed out that none of the rates specified in Award No. 728 is on an hourly basis and that the claim was in effect one for 7s. 10d. a week, an increase of nearly 11 per cent. to the highest rated and nearly 18 per cent. to the lowest rated timeworkers. For pieceworkers the claim would mean a minimum advance of 10s. 5d. a week. New machinery and new methods of organisation had rendered the work less arduous and easier to perform. They had not worsened the financial position of the railway shopmen but had on the whole tended to increase the earnings of pieceworkers.

As regards the war wage or bonus which was payable in addition to standard time rates, it was stated that though the amount of war wage in the relatively prosperous engineering industry had quite recently exceeded the war wage in railway shops, the war wage in the engineering industry had been below the war wage in railway shops for a period of no fewer than 15 years. Throughout the period of 15 years the claimants refused either to agree to the war wage in railway shops being brought into line with the war wage in the engineering industry or even to arbitrate on the issue. It was contended that railway shopmen were at the present time materially better off in terms of real wages, taking full account of variation in the cost of living, than they were pre-war, or at the introduction of Award No. 728, even if allowance was made for the working of short time. It was also pointed out that railway shopmen enjoyed certain advantages in regard to free or cheap travel.

It was contended that short time in railway shops was paralleled by short time in the engineering and other comparable industries and that the level of employment in railway shops had, throughout the past 15 years, been better than the level in the engineering industry. It was stated that comparable general wage claims in respect of Railway Conciliation Staff employed by the Railway Industry had been repeatedly rejected by the appropriate tribunal—the latest of such claims being rejected by the Railway Staff National Tribunal as recently as February, 1939.

As regards the claim for a minimum wage of 50s. the claim had been advanced on the basis of "human needs." The limited number of budgets submitted by the claimants was insufficient, it was suggested, for a decision on this basis. It was stated that the ratio of increase of present wages over pre-war wage levels in industry generally was estimated by the Trades Union Congress to be about 80 per cent. In the case of the lowest-rated railway shop staff the percentage was 124 per cent. It was submitted that the claim for a minimum wage of 50s. could fairly be said to be a claim for a minimum stan-

dard time rate of 33s. 6d. plus the current railway shops war wage of 16s. 6d. In the engineering industry it was stated that rates of 25s. a week were in force in some cases and a rate of 27s. a week applied in towns of some considerable importance. These rates were subject to a war bonus of 20s. for pieceworkers and 22s. for time workers. Comparisons as between the lowest rates of pay in railway shops and certain trade board trades were, it was submitted, fallacious.

It was submitted that the existing lowest time rate plus war wage for railway shopmen (44s. 6d.) was higher than the lowest current rate for railway conciliation staff (43s.) and appreciably higher than the lowest base rate for railway conciliation staff (41s.) which would come into operation if the cost of living index figure falls eight points. A similar claim for a 50s. minimum for railway conciliation staff had been rejected on several occasions by the Railway Staff National Tribunal—the latest rejection being as recent as February, 1939.

If the claim were conceded no fewer than 114 grades, placed by Award No. 728 on a number of different levels with appropriate differentials, would be brought on to one and the same level. It was submitted that this would be unjust to workmen of differing degrees of skill and of responsibility, and inconsistent with the principles of Industrial Court Award No. 728. Moreover, the claim if conceded would put upon one and the same level men in the same grade but employed in places differing as widely as small villages, great cities, and even London, which, by Industrial Court Award No. 728, were differentiated into six classes of place with varying rates of pay. This would again be inconsistent with the principles of Industrial Court Award No. 728. To concede the claim would render difficult, if not impossible, the present method by which semi-skilled grades are recruited by upgrading. It was submitted that the introduction of a minimum wage of 50s. could not fail to have repercussions, involving further heavy cost, in respect of grades only slightly higher rated than those coming within the actual proposal. Neither could it fail to have repercussions in regard to other sections of railway staff whose similar claim had recently been rejected by the appropriate tribunal.

As regards the claim for a guaranteed day and week, it was submitted that railway shops staff always got a full day. Railway shops staff (except a very small proportion of temporary staff) got a full week unless short time was being worked—or on bank or public holidays when they were not required. The extent of short time working was restricted by agreement. Restricted short time was the lesser of two evils where the alternative was heavy discharges of redundant staff. There was no precedent whatever for the claim for a guaranteed day or week, either in the engineering industry or in any

other industry even remotely comparable with the railway shops. In the case of the railway conciliation staff, who had a guaranteed day and week, the nature of work and the arrangement of duties were entirely different. Redundancy in the conciliation grades was met by transfer to other stations or depots or by demotion from grade to grade, methods which were not possible for the bulk of railway shop staff. It was further submitted that the conditions claimed would have little or no practical effect in affording protection to the shopmen when full time was being worked, but that it would make short time working impossible even when diminished requirements of output inevitably diminished the need for labour. Short time could be stopped, but it could be stopped only at the cost to the employees of heavy discharges.

As regards the claim for a second week's holiday with pay it was submitted that the claim could not be justified upon the alleged intensification of work and was not supported by the practice in industry generally, or in particular by the practice in the engineering industry. It was also submitted that the grant of a second week's holiday would inevitably reduce the output of the railway works. The concession claimed did not apply to any other section of wages staff employed on the railways, and claims for a second week's holiday for other wages staff employed on the railways had recently been rejected by the Railway Staff National Tribunal. Evidence was submitted as to the cost of the various claims made and as to the financial position of the companies, which it was contended was such that no additional burden to the already excessive labour cost could possibly be justified. There could be no justification, it was urged, for basing concessions upon forecasts of improvement in the financial position of the industry. In general it was submitted that the claims made had not been substantiated.

Decision of the Court

The decision of the Industrial Court on the various items is as follows:—

As regards Item I of the claim, *viz.*, that the standard time rates of pay be increased by 2d. an hour, the Court is satisfied that the claim has not been established, and so decides.

As regards Item 2 of the claim, *viz.*, that the total of the standard time rate and war wage be in no case less than 50s. a week, the Court notes that the concession of this claim would involve a departure from the basis upon which the various rates provided for in Award No. 728 proceed, *i.e.*, rates related to the occupations of the workpeople concerned and the localities in which they are employed, plus a uniform war wage or bonus. It would also affect the basis upon which piecework prices are fixed and would render inevitable a review of the rates of wages of other classes

of workpeople whose rates of wages had been fixed in relation to those affected by the present claim. In these circumstances the Court takes the view that whatever ground there may be for some adjustment in the level of wages of those at the lower end of the scale, the claim is not one which should be conceded either at the present time or in its present form, and so decides.

As regards Item 3 of the claim, *viz.*, that each employee be guaranteed (a) for each day he is available for duty a day's pay at standard time rate and war wage and (b) provided that he is available for duty throughout the week, a week's pay at standard time rate and war wage, and as regards Item 4 of the claim, *viz.*, that after twelve months' continuous service each employee be allowed twelve working days holiday per annum with pay at standard time rate and war wage, the grounds upon which these claims were advanced were not such as in the view of the Court to warrant the concession of the claims and the Court so decides.

Railway Wages

On Friday, June 30, the general managers of the four main-line railway companies met in London representatives of the three railway trade unions at the request of the latter to consider the representations submitted by the unions arising out of the issue of the recent decision of the Railway Staff National Tribunal upon the claims which were submitted to that body by the unions in February last. The railway companies undertook to consider the representations made and to communicate with the unions as soon as practicable. The special conference of the Associated Society of Locomotive Engineers and Firemen which met in April to consider Railway Staff National Tribunal Decision No. 5 decided to reject the decision and to re-open negotiations with the companies on the basis of the society's original demands. The National Union of Railwaymen rejected the decision and is now concentrating on one demand only—a minimum of 50s. a week for adults in conciliation grades. The Railway Clerks' Association accepted the decision of the tribunal but decided to support the National Union of Railwaymen in its claim for a 50s. minimum wage.

When these claims were considered by the Railway Staff National Tribunal in January last they were estimated to cost £2,356,000, and it is of interest to recall the comments of the tribunal on the individual claims at that time. They were as follow:—

Minimum Wage of 50s.—"The tribunal is of the opinion that a strong case has been presented for making an increase upon the lowest rates a first claim as soon as the financial position makes any substantial concession possible. It has, however, with regret come to the conclusion that a general improvement, involving necessarily a great extra annual cost, cannot be properly recommended at a

time when traffic receipts, and still more net earnings, have fallen so greatly and when the movement is still downwards."

Increased Rates for Drivers, Motormen, Firemen, and Cleaners.—"The tribunal has carefully considered the evidence and arguments of the two sides. It is not, however, convinced that there has been any such net increase in strain and responsibility as to justify a general increase in remuneration."

Twelve Days' Holiday.—"The tribunal recognises that a change in national standards in respect of holidays is now taking place; and if the present movement continues the case for some increase in holidays on the railways would merit a place among those to be presented when the financial position permits any general improvement. In general, however, the new

movement has not yet gone beyond the grant of a period of holidays with pay which is equal to that already in operation on the railways. Having regard to this and in view of the financial position, the tribunal does not consider that an increase of the present period is now practicable."

Minimum payment for Sunday duty.—"A claim as to Sunday signing on was made by the A.S.L.E.F. in 1937 and was rejected by the tribunal (Decision No. 3), partly because of the cost involved and partly because the grades in question are in a substantially better position than the other conciliation grades. These reasons remain, the first being stronger than before (both because the claim is now more extensive and the financial situation is worse) and the second being only very slightly modified by the slight con-

cession which the tribunal is now making to conciliation grades who are not trainmen."

Abolition of Extended Rosters.—"The tribunal in 1937 (Decision No. 3) found against the same claim as is now presented when it re-affirmed its previous Decision (No. 2) which remarked that such cases of unnecessary inconvenience as might have occurred did not in their opinion justify a cancellation of the decisions permitting rostering beyond the 8 hours which was "necessary to the efficient working of such an industry as the railways and, when reasonably worked with due regard to the necessity of avoiding preventable overtime, should not give rise to legitimate complaint. The tribunal must, for the reasons given, adhere to this Decision."

A "Meet the Sun" Excursion

Press tour of East Anglian resorts organised by the L.N.E.R. in connection with its "Meet the Sun on the East Coast" campaign

A party of some 40 representatives of the national and provincial press was taken by the L.N.E.R. last Monday to "meet the sun on the East Coast," and to see how the East Anglian resorts are exerting themselves so that visitors may have every facility for enjoying the favourable climate which has inspired the railway company's slogan. A special train was provided from Liverpool Street to Clacton, adorned with "Meet the Sun on the East Coast" headboards on the coaches, and a circular plaque carrying the same slogan and the sun device on the smokebox of the locomotive. At Clacton, where sunshine had appropriately succeeded a slightly uncertain outlook in London, the party joined motorcoaches for a tour along the coast to Felixstowe.

A visit was paid to Butlin's holiday camp at Clacton, where a substantial advance guard of the full holiday season influx is already in residence. The all-in fee at these camps covers, in addition to accommodation and food, the choice of outdoor amusements ranging from the pleasures of the fair-ground to athletic sports. A numerous company was patronising the swimming pool—which is maintained at a constant temperature—and a glimpse of others watching a boxing match at high noon suggested an unparalleled diversity of distractions as the day wears on.

From Clacton the tour was continued past Frinton and Walton, then taking a lengthy sweep inland within sight of the wide creeks that indent the coastline near the Naze and add to the variety of scene in this part of East Anglia. Back to the sea at Dovercourt, where the bay and the tree-crowned slopes that fringe it at one end are in surprising contrast to the severer front at Clacton, the coaches continued to the ferry pier at Harwich, and the party crossed to Felixstowe. Lunch was taken at the Felix Hotel.

Mr. H. H. Mauldin, Divisional General Manager, Southern Area,

L.N.E.R., presided at the luncheon. In welcoming the press and representatives of the resorts who had joined the party during the tour, he said that the railway was making a contribution to the health and pleasure of holiday-makers, and to national fitness. On the journey from London, the guests had seen work in progress at various parts of the route that would do a great deal to improve railway services and facilities for the East Coast resorts. Mr. Mauldin paid a tribute to the organising genius evinced in Butlin's holiday camps, and pointed out that, while doing everything to cater for the holidaymaker, the East Coast resorts were preserving their natural beauties. They enjoyed a long season, being attractive in early spring and late summer.

Mr. C. G. Dandridge, Advertising Manager, L.N.E.R., spoke on the inception and progress of the railway company's "Meet the Sun on the East Coast" campaign, which was launched

on April 3 of this year. Describing it as "a going concern and a most successful campaign," Mr. Dandridge said the scheme was gathering ground and branching out into new developments, encouraged by the results so far achieved.

Mr. C. J. Selway, Passenger Manager, Southern Area, L.N.E.R., proposed the toast of the press and the representatives of the resorts. The railway felt a very paternal interest in the resorts, to which it acted as a kind of lifeline, and would continue to do its very utmost to foster their trade. Mr. Selway described Butlin's camps as one of the most remarkable developments of modern times. They were the answer to the prayer for better and brighter holidays, because there dreams came true and strength was created through real joy. Mr. Selway coupled with the toast the names of Mr. Dawson of *The Star*, and Councillor Green of Clacton, both of whom replied briefly.

After lunch the party toured Felixstowe by motorcoach, inspecting the reconstructed Spa Pavilion and the Pier Pavilion, before joining the special train for the return to London.

Railway and Other Meetings

Great Southern of Spain Railway Co. Ltd.

The ordinary general meeting of the Great Southern of Spain Railway Co. Ltd. was held at River Plate House, 13, South Place, E.C.2, on July 3, Mr. C. H. Pearson, Chairman, presiding. The Secretary, Mr. F. P. Higgs, read the notice convening the meeting and the auditors' report. The Chairman, in moving the adoption of the report and accounts, referred to the seizure of the company's undertaking and property in Spain by the Workers' Council in 1936, and the subsequent decrees of the Republican Government. During 1938 no direct news was received of the local situation, but with the termination of the civil war early in 1939 it was to be expected that the victory of the Nationalist forces would fundamentally alter the situation. No

official intimation had, however, been received, and a communication was presented to the Nationalist Government setting forth the critical situation into which the company had been forced, due to the lack of the promised assistance to compensate for increased wages and other burdens, and later, to the seizure of the property. No reply had been received and the future was wholly dependent upon the decision of the Spanish Government. The new Spanish railway law dated May 8 last, which appointed directing councils for the principal railways, could hardly be considered as a good augury. As regards the accounts, in the absence of particulars from Spain no useful purpose would be served by any amplification of the figures in the balance sheet.

NOTES AND NEWS

U.S.A. Railroad Passenger Stock.

—Class I railroads in the U.S.A. have 40,259 passenger-train carriages, in addition to the 7,757 owned by the Pullman Company. Nearly 11,000 of the combined total are air-conditioned.

Collision near Milan.—A local passenger train collided with a stationary goods train at Lambrate station, near Milan, on July 2. Three persons are reported to have been killed and ten seriously injured.

Siam Renamed "Thailand."

—The Council of Ministers in Siam decreed on June 24 that from that date onwards the word "Thailand" shall be used for Siam and "Thai" for Siamese by the Ministries and departments of the Thai Government.

New Arrival Box at Paddington, G.W.R.

—The new G.R.S. all-electric Paddington Arrival signal box, replacing that destroyed by fire on November 25 last, was brought into full use on July 2. The new box has a switch controlling all the power in the signal frames, which could thus be cut off in the event of fire. Another switch would cause the release of carbon dioxide to extinguish any fire.

Argentine Transandine Holdings Limited.

—The registration is announced of a company with a title as above, to acquire the assets of the Argentine Transandine Railway Co. Ltd., with a view to the gradual realisation thereof and distribution of proceeds, pursuant to a scheme of arrangement dated May 9, 1939. The nominal capital is £21,250 in 1s. shares. The Act providing for the purchase of the Argentine Transandine Railway by the Government was signed by the President of the Republic on January 20.

Grand Union Canal Company.

—Notice is given by the Grand Union Canal Company that it has applied to the Minister of Transport for a warrant and order under Section 45 of the Railway and Canal Traffic Act, 1888, to authorise the abandonment of the Cumberland basin of the Regents section of the Grand Union Canal and the whole of the collateral cut known as the Cumberland Arm extending therefrom to the main line of the Regents section except a small portion near the Water Meeting bridge in Regent's Park.

Defence Planning for Transport.

—Captain Euan Wallace, the Minister of Transport, speaking last Wednesday on the Ministry of Transport vote, said that defence planning had lately become the most important work of the Ministry. It was proposed that in time of war the undertakings of the main-line railway companies and the L.P.T.B. should be controlled by the Minister on behalf of the Government. Machinery and procedure of control had been settled and instructions issued to the railway companies and

Government departments concerned. Detailed plans for rail transport in connection with civil evacuation had been prepared and were ready for use if required. Work of A.R.P. on railways included accumulation of stocks of plant for urgent repair work, and the railways would be well prepared to maintain essential services.

Level Crossing Accident in Sweden.

—Five persons are reported to have been killed and a sixth seriously injured when a train on the Stockholm-Malmö line collided with a motorcar at a level crossing near Moeckeln station on July 2.

New Zealand Institution of Engineers.

—In consequence of the acquisition by the Government of New Zealand of the institution's Molesworth Street property, the offices of the institution have been transferred to 8-12, The Terrace, Wellington, C.I.

L.M.S.R. Improvement at Carnforth.

—An important stage of the station modernisation scheme which the L.M.S.R. is carrying out at Carnforth was reached on Sunday last, July 2, when the new "down" platform for trains to the Barrow-in-Furness direction was brought into use, together with the appropriate signalling equipment. This new platform is 890 ft. long and its introduction will greatly ease the working of summer holiday traffic through Carnforth, as hitherto trains both to and from the Furness line have had to be accommodated at one platform.

Tokyo Central Station Congestion.

—Tokyo Central station, which by some was considered too large when it was opened in 1914, is now suffering from serious congestion. About 30,000 passengers use it hourly in the rush hours, and over 350,000 are handled daily on an average. Plans for enlargement of the station are held up owing to lack of necessary materials, due to the hostilities in China, but, according to a Reuters message, the Japanese Ministry of Railways is offering prizes to officials and employees who send in useful suggestions for relieving the situation.

Financial Structure of the L.P.T.B.

—The Minister of Transport has rejected the demand for a public inquiry into the financial structure of the London Passenger Transport Board made recently to him by a deputation led by Mr. W. J. Brown, Secretary of the Civil Service Clerical Association, and convened by the Federation of Ratepayers and Kindred Associations of Surrey. In a letter to Mr. A. H. Page, Secretary of the federation, the Minister also rejects the deputation's request for a reconstitution of the Railway Rates Tribunal. The Minister bases his refusal on the grounds that "the public interest requires that the transport system in London should be worked upon an

economic basis." The letter adds: "The alternatives to economic charges are bankruptcy or State subsidy, and the Minister is not prepared to suggest to Parliament an alteration of the obligations placed on the board or of the directions to the tribunal which were designed to avoid those contingencies."

Manslaughter Charge After Level Crossing Accident.

—Reuben Height, driver of the lorry involved in the collision with an L.N.E.R. express at Hilgay level crossing on June 1, was charged at Downham Market on June 5 with the manslaughter of four passengers killed in the accident. With his mate, Arthur Pearce, Height was charged with causing bodily harm to a girl who was injured in the accident, and with endangering the safety of the fireman of the train and other persons on the railway. Both men were committed for trial to the Norwich Assizes, and were allowed bail.

L.N.E.R. Assessment.

—The Railway Assessment Authority notifies that on June 30 it completed that part of the second railway valuation roll which relates to the London & North Eastern Railway. The total average net receipts of the undertaking as a whole in England and Wales for the years 1930-34 as contained in the draft roll (£8,238,739) have not been altered. The cumulo net annual value as appearing in the draft roll (namely, £1,100,000) also remains unaltered. Of the cumulo of £1,100,000 there has been allocated to the principal undertaking the sum of £1,037,742, to the docks £60,975 in the aggregate, and to the canals £1,283. Of the £1,037,742 there has been allocated to Class A as a whole £830,212 and to Class B as a whole £207,530.

Questions in Parliament

Removal of Civil Servants' Furniture

Colonel Sandeman Allen (Birkenhead West—C.), on June 29, asked the Chancellor of the Exchequer whether he was aware that in the instructions to civil servants concerning removals there had appeared a recommendation that the railway should be chosen for the removal; and would he issue instructions to all Government Departments that there should be no restriction of choice of removal contractors.

The Chancellor of the Exchequer (Sir John Simon): My hon. and gallant friend would appear to have been misinformed. Civil servants compulsorily transferred from one part of the country to another are required to submit three competitive tenders in writing for the removal of their furniture, one of the tenders being from a railway company; if the distance of transfer is 60 miles or more. Officers may accept whichever tender they choose, but payment from public funds is restricted to the amount of the lowest tender save for good reasons to the contrary.

Colonel Sandeman Allen: Is the right hon. gentleman aware that one civil servant was offered a free railway ticket for his daughter provided that he took the railway tender?

The Chancellor of the Exchequer: I am not aware of that.

Indian State Railways

Mr. H. Day (Southwark Central—Lab.), on July 3, asked the Under Secretary of State for India whether he would state the number of employees working on State-owned railways in India; and give the estimated mileage under control of private companies.

Lt.-Colonel A. J. Muirhead (Under Secretary of State for India): The number of employees working on State-owned railways, at March 31, 1938, was 636,194, of whom 368,208 were on lines worked by the State and the remainder on lines worked by companies. The mileage of company-owned lines, at the same date, was 4,143. In addition, there were 14,036 miles of State-owned lines worked by companies.

Mr. Day: Are there any statistics

to show how many of these employees are Anglo-Indians?

Lt.-Colonel Muirhead: I will look into that question.

Overcrowding of Trains

Mr. R. De La Bère (Worcester, Evesham—C.), on July 5, asked the Minister of Transport whether, in view of the continuing daily overcrowding of trains by members of the public who were endeavouring to reach home from the congested areas in London, he would take steps to compel the appropriate transport companies to take some action to redress this.

Captain Euan Wallace: The railway companies and the London Passenger Transport Board are fully alive to the problem of the rush hours, to which my hon. friend refers, and they are already engaged on a very large programme of works with the object of improving the London railway services. The Government is assisting in these developments by a guarantee of the capital to finance the works. My hon. friend will be aware that I have no power to compel the provision of increased facilities.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 26th Week			Totals to Date		
	1939	1938	Inc. or Dec.	1939	1938	Inc. or Dec.
L.M.S.R. (6,828 mls.)						
Passenger-train traffic...	697,000	694,000	+ 3,000	12,048,000	12,220,000	- 172,000
Merchandise, &c. ...	508,000	426,000	+ 82,000	12,139,000	12,128,000	+ 11,000
Coal and coke ...	233,000	211,000	+ 22,000	7,054,000	6,783,000	+ 271,000
Goods-train traffic ...	741,000	637,000	+ 104,000	19,193,000	18,911,000	+ 282,000
Total receipts ...	1,438,000	1,331,000	+ 107,000	31,241,000	31,131,000	+ 110,000
L.N.E.R. (6,320 mls.)						
Passenger-train traffic...	405,000	413,000	- 8,000	7,798,000	7,880,000	- 82,000
Merchandise, &c. ...	347,000	301,000	+ 46,000	8,339,000	8,542,000	- 203,000
Coal and coke ...	249,000	210,000	+ 39,000	6,659,000	6,367,000	+ 292,000
Goods-train traffic ...	596,000	511,000	+ 85,000	14,998,000	14,909,000	+ 89,000
Total receipts ...	1,001,000	924,000	+ 77,000	22,796,000	22,789,000	+ 7,000
G.W.R. (3,737½ mls.)						
Passenger-train traffic...	260,000	264,000	- 4,000	5,031,000	5,038,000	- 7,000
Merchandise, &c. ...	215,000	176,000	+ 39,000	4,930,000	4,930,000	+ 0
Coal and coke ...	109,000	98,000	+ 11,000	2,953,000	2,880,000	+ 73,000
Goods-train traffic ...	324,000	274,000	+ 50,000	8,126,000	7,810,000	+ 316,000
Total receipts ...	584,000	538,000	+ 46,000	13,157,000	12,848,000	+ 309,000
S.R. (2,142 mls.)						
Passenger-train traffic...	387,000	384,000	+ 3,000	7,832,000	7,809,000	+ 23,000
Merchandise, &c. ...	75,000	65,000	+ 10,000	1,581,500	1,585,500	- 4,000
Coal and coke ...	33,000	28,000	+ 5,000	846,500	808,500	+ 38,000
Goods-train traffic ...	108,000	93,000	+ 15,000	2,428,000	2,394,000	+ 34,000
Total receipts ...	495,000	477,000	+ 18,000	10,260,000	10,203,000	+ 57,000
Liverpool Overhead ...	1,350	1,393	- 43	36,253	35,203	+ 1,050
(6½ mls.)						
Mersey (4½ mls.) ...	4,444	4,302	+ 142	116,382	113,337	+ 3,045
*London Passenger Transport Board ...	595,400	582,800	+ 12,600	595,400	582,800	+ 12,600
IRELAND						
Belfast & C.D. pass. (80 mls.)	3,310	3,030	+ 280	54,449	52,064	+ 2,385
" " goods	545	477	+ 68	11,209	11,170	+ 39
" " total	3,855	3,507	+ 348	65,658	63,234	+ 2,424
Great Northern pass. (543 mls.)	14,700	13,450	+ 1,250	247,450	239,300	+ 8,150
" " goods	13,050	10,000	+ 3,050	264,600	228,100	+ 36,500
" " total	27,750	23,450	+ 4,300	512,050	467,400	+ 44,650
Great Southern pass. (2,076 mls.)	44,285	42,542	+ 1,743	833,581	823,748	+ 9,833
" " goods	39,592	35,380	+ 4,212	1,044,022	1,020,495	+ 23,527
" " total	83,877	77,922	+ 5,955	1,877,603	1,844,243	+ 33,360

* 1st week (before pooling)

British and Irish Railway Stocks and Shares

Stocks	Highest 1938	Lowest 1938	Prices	
			July 5, 1939	Rise/Fall
G.W.R.				
Cons. Ord. ...	65½	25¾	32½	—
5% Cons. Prefce....	118¾	74	89	+1
5% Red.Pref.(1950)	111¾	90	95	—
4% Deb. ...	111	97½	94½	—
4½% Deb....	112½	100½	100	—
4½% Deb....	118½	104	102½	—
5% Deb. ...	131½	119	112½	—
2½% Deb....	69¾	60	59	—
5% Rt. Charge ...	129	114	109½	—
5% Cons. Guar. ...	128½	103	105	-2
L.M.S.R.				
Ord. ...	30½	11	14½	+½
4% Prefce. (1923)	70½	23	38½	-1
4% Prefce. ...	82¼	43¾	58½	—
5% Red.Pref.(1955)	103½	66	76½	-2
4% Deb. ...	105½	85	87½	—
5% Red.Deb.(1952)	114¼	105	107	—
4% Guar. ...	102¾	77½	80½	—
L.N.E.R.				
5% Pref. Ord. ...	89½	3½	4½	-½
Def. Ord. ...	47½	21½	2½	-½
4% First Prefce.	68½	21	30½	-2
4% Second Prefce.	27½	8	11½	-1
5% Red.Pref.(1955)	97	40½	48½	-2
4% First Guar. ...	97½	66½	69½	-2
4% Second Guar. ...	91¼	52	61½	-1
3% Deb. ...	79½	60	62½	—
4% Deb. ...	104½	77	83½	—
5% Red.Deb.(1947)	110½	97	103½	—
4½% Sinking Fund Red. Deb.	108½	101	98	—
SOUTHERN				
Pref. Ord. ...	87	47½	71	-1
Def. Ord. ...	21¾	9½	15½	-¾
5% Pref. ...	115	83	94½	—
5% Red.Pref.(1964)	115½	98	99½	—
5% Guar. Prefce.	128½	106	110	—
5% Red.Guar.Pref. (1957)	116	109½	108½	-1
4% Deb. ...	109¼	95	93½	—
5% Deb. ...	129	117	114	—
4% Red. Deb. 1962-67	107	101½	101½	—
BELFAST & C.D.				
Ord. ...	4	3½	4	—
FORTH BRIDGE				
4% Deb. ...	102	99½	92½	—
4% Guar. ...	103¼	94½	89	—
G. NORTHERN (IRELAND)				
Ord. ...	5½	2½	4	—
G. SOUTHERN (IRELAND)				
Ord. ...	25½	8½	10	—
Prefce. ...	35	13	12½	-½
Guar. ...	70¼	30½	31	—
Deb. ...	83	56	53	+1
L.P.T.B.				
4½% "A" ...	119½	107½	104½	-1
5% "A" ...	130	117	112½	-2
4½% "T.F.A." ...	108	98	102½	—
5% "B" ...	122½	105	107½	-1
"C" ...	84	68	73½	-6
MERSEY				
Ord. ...	24½	16½	23	—
4% Perp. Deb. ...	102½	94½	91	—
3% Perp. Deb. ...	77	69	66½	—
3% Perp. Prefce.	66½	57	52½	—

* ex dividend

Press Visit to Keith Blackman Limited

On Wednesday, July 5, members of the press were entertained at luncheon by the Chairman and directors of Keith Blackman Limited, and given facilities for inspecting the firm's new premises at Tottenham. These premises occupy an area of 10½ acres and consist of a block of spacious and up-to-date offices for an administrative and clerical staff totalling 300, and works where the manufacture of the firm's products gives occupation to 900 employees; amongst the other amenities there is a canteen (with adjoining cafeteria), capable of providing meals for 650 at one sitting. Both gas and electricity are used for lighting the works, Keith high-pressure gas lamps for the general lighting and electric lamps for the individual lighting of machines. All the electricity for works production requirements and testing purposes is provided by six diesel engines and generators in the company's own powerhouse. The firm has a private siding, close to the L.N.E.R. station at Tottenham, and the equipment for loading and offloading wagons includes a crane and overhead traverser; much of the traffic is received and despatched in containers, and castings from the company's foundry at Arbroath are brought down in approximately 18 hours. One wall of the powerhouse runs alongside the siding, so that fuel supplies can be taken from rail tank wagons, when necessary.

For the heating and ventilation of the offices, the Keith Blackman balanced system of inlet and exhaust is used, providing six air changes an hour in the summer and four in the winter; exposure losses are dealt with by direct radiator warming. In winter the system is designed to maintain a temperature of 65° throughout the offices, and the plant is automatically controlled by means of thermostats and magnetic solenoid valves. Comprehensive systems of a similar kind have also been installed in the main works, powerhouse, canteen, and lavatories. During a tour of the works, opportunities were given of inspecting the processes by which the 20 types of fan turned out by Keith Blackman Limited are manufactured, as well as the auxiliary equipment for use with these fans; other products seen in course of manufacture included gas-fired boilers for hot-water supply, high-pressure gas injectors and burners, gas furnaces, rotary compressors, the Keith light (high-pressure gas) for public and industrial lighting, and thermostatic controllers. One of the most impressive parts of the works is the electrical test shop, where it is possible to test 200 machines at one time; over 20,000 electric motors for direct coupling to fans, blowers, compressors, &c., are made every year.

Mr. E. Leslie Gale, of Messrs. F. Clifford Tee & Gale (who designed the new buildings), speaking at the luncheon, made appreciative references to the company's excellent arrangements and to the hospitality which had been

meted out to the visitors; Mr. George Keith, Chairman and Managing Director, replied briefly. In addition to Mr. Keith, the following officers of the firm were among those who received the guests and conducted them over the works:—

Mr. J. W. Hampshair, General Manager and Director; Mr. W. B. Richards, Technical Manager and Director; Mr. M. Burningham, Secretary and Director; Mr. D. M. Brown, Director; Mr. D. S. Woodley, Chief Engineer and Director; Messrs. C. Galloway and J. A. Spray, respectively Chief and Assistant Works Managers, and Mr. A. V. Carder, Publicity Manager.

East Indian Railway Dinner

The East Indian Railway Officers' 41st annual dinner was held at the Trocadero Restaurant, on Friday, June 30, with Dr. E. W. Guinness, O.B.E., in the chair. Others present were:—

Messrs. A. H. Aslett, G. Aslett, H. Kelway Bamber, M.V.O., J. A. Bell, E. A. Blackwood, R. L. Bliss, F. S. Bond, Dr. R. D. Brinton, Dr. A. Carnarvon Brown, Messrs. W. H. Burnand, J. Cambridge, A. C. Carr, W. C. Cartland, H. Chapman, A. H. Chilton, H. Merson Davies, W. H. Denby, J. T. Derry, A. Devon, R. Dormer, S. T. Dutton (Hon. Sec.), Sir James Duncan Elliot, K.B.E., Messrs. H. G. Emmerston, C. Evers, W. I. Ferrar, A. W. Goldsack, A. R. Gundry, E. D. Guinness, Capt. R. D. Guinness, R.E., Messrs. P. Hackforth, E. J. Harris, Sir Clement Hindley, K.C.I.E., V.D., Dr. B. W. Holmes, Mr. H. Howe, Capt. Sir Ernest W. Huddleston, C.I.E., C.B.E., Lt.-Colonel G. Huddleston, C.I.E., V.D., Capt. W. B. Huddleston, C.M.G., Messrs. G. R. G. Huddleston, H. B. Huddleston, O.B.E., D. Livingstone, G. D. Mathews, R. E. L. Maunsell, C.B.E., R. F. McAllister, J. E. Monk, R. D. Moss, E. G. Moyes, P. G. Murray, G. H. Ormerod, W. E. Pincombe, B. V. Radley, Colonel A. W. Rendell, V.D., Messrs. F. E. Robertson, C. F. Satow, Sir Philip Sheridan, C.M.G., Messrs. F. A. Sherrieff, W. J. Smith, L. Snelgrove, W. M. Thomas, W. J. Tomes, Julian Tritton, A. V. Venables, M.C., H. C. Wallace, Sir Harry Waters, K.T., Messrs. W. J. Watters, W. G. Wheatley, T. A. White, W. W. Whitney, A. E. Williams, C. G. Young, and H. H. Yules.

The Chairman, in proposing the toast of the evening, "The East Indian Railway," said he considered it the greatest honour to preside over his dear old friends, and that it comforted him to see so many survivors of his skill. He then recounted several amusing stories, English, Scotch, and Irish, before finally giving the toast. Later he also proposed the health of "The Guests," coupled with the name of Mr. G. H. Ormerod, Chairman of the Assam-Bengal Railway.

Mr. Ormerod, in reply, pointed out that the A.-B.R. had always been closely affiliated with the E.I.R. They had had a common Chairman in Sir R. Strachey, and the same medical officer, Dr. Brinton, and the A.-B.R. had contributed to the E.I.R. by giving it Messrs. Monk and Thomas. Colonel Huddleston was also a member of the A.-B.R. board and had done great work for that line in difficult times.

The Chairman finally proposed the health of the popular Honorary Secretary of the dinner, "Sammy Dutton," in eulogistic terms. In support, Lt.-

Colonel G. Huddleston said he was the only other person with experience of the work entailed by the hon. sec., and, since Mr. Dutton had taken over the duties from him there had been no single cause of complaint. He suggested that a collection should be made for a souvenir for Mr. Dutton. Incidentally, Colonel Huddleston mentioned that he had just completed Part 2 of his "History of the East Indian Railway Company." Part 1 was completed in 1906 and Part 2 dealt with the period 1906-24, when the line became a State Railway.

Mr. Dutton's health was drunk with musical honours, and he suitably replied.

A very pleasant evening was officially concluded by the Chairman's announcement that his successor at next year's dinner would be Mr. W. H. Burnand.

Railway and Other Reports

London Midland & Scottish Railway Company.—The full half-year's dividend due on July 1 on the 5 per cent. redeemable preference stock (1955) has been paid on the due date, the same as a year ago.

Colombia Railways & Navigation Co. Ltd.—The loss for the year to June 30, 1938, was £9,436, increasing the debit forward to £97,903. Negotiations regarding the sale of the railway were taken up with the present Government, which came into office in August last. By a letter dated May 11, the company was informed that the Government was prepared to acquire the railway at a price to be fixed by expert engineers appointed by each party. Having regard to all the circumstances the board accepted the proposal; but, although the main terms of the original contract of 1933 will still apply, owing to certain limits placed on the valuation and to heavy obligations under social legislation passed since the date of the original contract, the proceeds of sale will be much less than formerly expected. The valuation is to be proceeded with forthwith.

Kendall & Gent Limited.—Payment of an interim dividend of 5 per cent. is announced, the same as a year ago.

A.B.C. Coupler & Engineering Co. Ltd.—An interim dividend of 5 per cent. is being paid, which is the first interim distribution since 1929. A dividend of 10 per cent. was paid for the 12 months ended September 30, 1938.

G. D. Peters & Co. Ltd.—It is announced by the company that in future consideration will not be given to the question of an interim dividend declaration before September. It is the company's practice to pay any final dividend about March 31, and this alteration in procedure is being made in order that any dividend payments which may be made shall be spread more evenly over the year.

OFFICIAL NOTICES

Bombay, Baroda & Central India Railway Co. Ltd.

NOTICE IS HEREBY GIVEN THAT THE ONE HUNDRED AND FIFTY-SECOND GENERAL MEETING of the Bombay, Baroda & Central India Railway Company will be held at Southern House, Cannon Street, London, E.C.4, on Wednesday, the 19th July, at 1 o'clock precisely:

- (1) To receive the Directors' Report and Accounts.
- (2) To declare a dividend.
- (3) To approve and authorise the Board of Directors in their discretion to make a grant, out of the Stockholders' Funds, to the Company's Agent and General Manager in Bombay for the time being of an Entertainment Allowance at a rate of not exceeding £500 per annum.
- (4) To transact the General Business of the Company.

Warrants for the guaranteed interest and dividend will be forwarded on the 19th day of July to Stockholders registered in the Company's Books on the 24th day of June, 1939.

By Order,

N. LINCOLN,

Secretary.

N.B. A copy of the Directors' Report and Accounts can be obtained by any Stockholder on application to the Secretary.

Offices: The White Mansion,
91, Petty France,
Westminster, S.W.1.
3rd July, 1939.

TENDERS are invited by the Imperial Iranian Government for Locomotives and Wagons for the Iranian State Railways. Specifications may be obtained on application to the Honorary Commercial Attaché to the Imperial Iranian Legation, Ling House, 10-13, Dominion Street, London, E.C.2.

Crown Agents for the Colonies

COLONIAL GOVERNMENT APPOINTMENTS

APPLICATIONS from qualified candidates are invited for the following post:—
ASSISTANT DISTRICT ENGINEER required by the Government Railways of Palestine for two tours of 18-24 months with prospect of permanency. Salary £P430—£P15—£P550 a year, plus expatriation allowance of £P50 a year and cost of living allowance, at present £P48 per annum. A higher commencing salary may be given to experienced candidate. (£P1 equals £1). Free passages, and, if married, for wife and children, and leave on full salary. Candidates age 23-40, must be Corporate Members of the Institution of Civil Engineers or hold an Engineering Degree recognised as granting exemption from Sections A and B of the A.M.I.C.E. examination.

Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience and mentioning this paper to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M/8416

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to:—The Railway Gazette, 33, Tothill Street, Westminster, London, S.W.1.

Universal Directory of Railway Officials and Railway Year Book

45th Annual Edition, 1939-40

This unique publication gives the names of all the principal railway officers throughout the world, together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented.

New edition now in press.

Price 20/- net.

THE DIRECTORY PUBLISHING CO., LTD.
33, Tothill Street, Westminster, S.W.1.

CONTRACTS AND TENDERS

Substation Equipment for L.N.E.R.

The General Electric Co. Ltd. has received from the L.N.E.R., in connection with the electrification of the company's suburban lines from Liverpool Street and Fenchurch Street to Shenfield, a contract for plant and switchgear to be installed in six substations and three sectionalising track cabins. The equipment (except for the supervisory control equipment and the high-tension switchgear for two substations) will be manufactured at the Witton engineering works of the G.E.C., and includes 14 twin-cylinder air-cooled steel-clad rectifiers complete with main 33,000-volt transformers, each rectifying equipment rated at 2,000 kW, 1,500 volts d.c.; switchgear for controlling the 33,000-volt incoming supply, including 10 metal-clad units (all of 500,000 kVA, breaking capacity); and approximately 77 high-speed circuit breakers, 1,500 volts d.c. The rectifiers are the first air-cooled steel-clad units to be supplied for service at 1,500 volts.

Uddeholm General Agencies Limited has received an order from the South Indian Railway, to the inspection of Messrs. Robert White & Partners, for 48 solid-drawn smoketubes.

The following orders have been placed by the Bombay, Baroda & Central India Railway, to the inspection of Messrs. Rendel, Palmer & Tritton:—

J. T. Inglis & Sons Ltd.: 125 chemically-dressed wagon covers.

Johnson & Phillips Limited: 21,000 ft. of cable for power signalling.

Taylor Bros. & Co. Ltd.: 100 disc wheel centres for electric stock motorcoach bogies; and 150 steel tyres (sorbite) for electric stock.

Steel Company of Scotland Limited: 150 steel tyres for carriages and wagons, and 77 steel straight axles for motorcoaches.

J. Browett-Lindley (1931) Limited has recently completed a large contract for Machinoimport, U.S.S.R., comprising 23 air-compressors—ten having a capacity of 4,000 cu. ft. per min. and thirteen of 2,100 cu. ft. per min. when delivering at a pressure of 120 lb. per sq. in. These machines are of the firm's standard two-stage, double-acting, cross-head type, and are arranged for direct coupling to electric motors.

The Birmingham Railway Carriage & Wagon Co. Ltd. has received an order from the Morvi Railway, to the inspection of Messrs. Robert White & Partners, for 30 four-wheel covered goods wagons, "MA3" type, and 20 four-wheel covered goods wagons, "MA1" type.

The A.B.C. Coupler & Engineering Co. Ltd. has received an order from the Morvi Railway, to the inspection of Messrs. Robert White & Partners for 50 vehicle sets of "MCA/PH" type buffers.

John Pickles & Son (Engineers) Ltd. has received an order from the Bikaner State Railway for one planing and thicknessing machine, to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

The Pullman Standard Car Export Corporation has received an order from the Entre Rios Railways for 350 chilled cast-iron wheels for 30-ton wagons.

Leyland Motors Limited has received an order from the Western Welsh Omnibus Co. Ltd. for two oil-engined single-deck passenger vehicles.

Leyland Motors Limited has also received an order from Southdown Motor Services Limited for 16 oil-engined double-deck vehicles and 14 oil-engined single-deck vehicles.

The Chinese Government Purchasing Commission, on behalf of the Ministry of Communications, China, has placed orders to the inspection of Messrs. Fox and Mayo with W. T. Henley's Telegraph Works Limited for 100 sets of linesmen's bicycles, and 144 linesmen's vices; and 60,000 m. of copper wire.

The L.M.S.R. has decided to construct a further 300 shock-absorbing wagons similar to those introduced as an experiment in 1938, bringing the total stock up to 506.

Hadfields Limited has received the following orders from the Karachi Port Trust, to the inspection of Messrs. Rendel, Palmer & Tritton:—

76 nickel-chrome molybdenum steel bucket pins for bucket dredger *Barbus*.

110 nickel-chrome molybdenum steel bucket pins for bucket dredger *Thomas Coad*.

J. Walsh & Co. Ltd. has received an order from the South Indian Railway, to the inspection of Messrs. Robert White & Partners, for 386 panel sheets.

The Birmingham Carriage & Wagon Co. Ltd. has received an order from the Crown Agents for the Colonies for 29 carriage underframes and bogies for the Federated Malay States Railways.

The Bombay, Baroda & Central India Railway is inviting tenders, receivable by July 19, for the supply of locomotive boilers.

The General Administration of the Iranian State Railways invites tenders, receivable by August 26—D.O.T. ref. T. 23585/39—for the supply of locomotives, wagons, and coaches.

Forthcoming Meeting

July 19 (Wed.)—Bombay, Baroda & Central India Railway Co., Ltd. (Annual), Southern House, Cannon Street, E.C., at 1 p.m.

Railway Share Market

The good traffics for the past week failed to assist the trend in home railway securities, which was dominated by the uncertain conditions prevailing on the Stock Exchange and by the claims put forward by the railway unions for a 50s. a week minimum wage. Had markets been reasonably active the stocks of the main line companies would no doubt have shown some response to the fact that the railways have closed the first half of the year with an aggregate traffic increase of £483,000, which must be regarded as an excellent achievement, bearing in mind that towards the end of March there was a decrease of over £1,700,000.

Payment of the interim dividend on L.M.S.R. 5 per cent. redeemable preference stock created a good impression, as it indicates that on July 27 the full half-yearly dividend on the 4 per cent. preference stock will also be announced. It is not expected, however, that any interim payment will be made on the 1923 preference, although the latter is generally expected to return to the dividend list in respect of the current year. The last-named stock has fluctuated this week around 37½, the 4 per cent. preference

around 57½ and the ordinary stock around 13½. The market is continuing to take the view that the decisions in regard to the forthcoming half-yearly dividends are likely to be the same as a year ago, despite the probability that the net revenue figures will show moderate improvement owing to larger economies effected. Moreover, it is assumed in many quarters that the upward movement in traffics should make excellent progress in the current half of the year. It continues to be generally expected that on this occasion the half-yearly dividend payments on L.N.E.R. guaranteed stocks will not require any temporary withdrawal from reserves. The first guaranteed has been around 70½ and the second guaranteed around 62, while after a small improvement, the first preference reacted to 29½ and the second preference to 11½. L.N.E.R. 3 per cent. debentures were 62½ and the 4 per cent. debentures 83. Southern preferred, after declining to 69, improved slightly to 69½, while the deferred was around 14½, the 4 per cent. debentures 93, and the 5 per cent. preference 94½. The Southern's traffics usually make the best showing in the second half of the year and they should benefit from the upward trend expected

in the spending power of the public. Great Western ordinary fluctuated moderately between 31 and 32, while the 5 per cent. preference was 89 and the 4 per cent. debentures 95. London Transport "C" has been lowered sharply to 73½, although the general belief is that in respect of the financial year ended last month the dividend is likely to be 4 per cent. The 4½ per cent. "A" stock showed a small decline but subsequently rallied to 105, while the 5 per cent. "A" stock was 112 and the 5 per cent. "B" 108½.

Argentine railway securities, which continued to attract very little attention, and moved closely with the day-to-day trading of markets, were again lower on balance. B.A. Great Southern 5 per cent. preference has declined to 21½ and Central Argentine 6 per cent. preference to 23½. Central Argentine 5 per cent. debentures were lowered to 55½, while B.A. & Pacific consolidated debentures were reduced to 31 and B.A. Western 4 per cent. debentures to 45½. San Paulo ordinary stock was lower, as were Leopoldina debentures, but International of Central America was fractionally better at 57½. Hopeful crop reports failed to assist Canadian Pacific shares.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1938-39	Week Ending	Traffic for Week		No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices						
			Total this year	Inc. or Dec. compared with 1938		Totals		Increase or Decrease		Highest 1938	Lowest 1938	July 5, 1939	Yield % (See Note)			
						This Year	Last Year									
South & Central America	Antofagasta (Chili) & Bolivia	834	2.7.39	£ 12,490	-	£ 160	26	337,510	426,100	-	£ 88,590	Ord. Stk.	14	71½	61½	Nil
	Argentine North Eastern ..	753	1.7.39	10,372	-	639	1	1,774	3,412	+	1,638	A. Deb.	82	2	31½	Nil
	Argentine Transandine ..	—	—	—	—	—	—	—	—	—	—	6 p.c. Deb.	8	7	6½	Nil
	Bolivar	174	June 1939	4,650	+	1,100	26	24,950	22,600	+	2,350	Bonds	10	4	6	85½
	Brazil	—	—	—	—	—	—	—	—	—	—	Ord. Stk.	61½	31½	4	Nil
	Buenos Ayres & Pacific ..	2,801	1.7.39	74,069	+	7,056	1	16,439	19,231	-	2,792	Mt. Deb.	15½	8	12½	Nil
	Buenos Ayres Central ..	190	10.6.39	\$113,400	+	\$1,000	50	\$5,030,100	\$5,680,800	-	\$650,700	Ord. Stk.	175½	8½	8	Nil
	Buenos Ayres Gt. Southern ..	5,082	1.7.39	112,965	-	4,529	1	15,074	36,166	-	21,092	"	125½	5	6	Nil
	Buenos Ayres Western ..	1,930	1.7.39	37,283	-	2,605	1	5,025	8,374	-	3,349	"	131½	5½	6½	Nil
	Central Argentine	3,700	1.7.39	132,826	+	27,705	1	9,234	24,150	-	14,916	"	6	2½	3	Nil
	Do	—	—	—	—	—	—	—	—	—	—	1st Pref.	6d.	6d.	1½	Nil
	Cent. Uruguay of M. Video ..	972	24.6.39	18,226	+	1,182	52	962,509	962,025	+	484	Ord. Stk.	3	11½	1	Nil
	Costa Rica	188	May 1939	24,302	+	2,198	48	245,516	283,030	-	37,514	Stk.	28	22½	23½	8½
	Dorada	70	May 1939	14,500	-	3,800	21	66,800	79,200	-	12,400	1 Mt. Db.	105½	104	102½	5½
	Entre Rios	810	1.7.39	18,046	+	2,556	1	3,480	4,621	-	1,141	Ord. Stk.	71½	3½	4	Nil
	Great Western of Brazil ..	1,092	1.7.39	4,700	-	100	26	230,700	183,900	+	46,800	Ord. Sh.	3½	1½	1½	Nil
	International of Cl. Amer. ..	794	May 1939	\$516,275	-	\$11,817	21	\$2,800,928	\$2,584,878	+	\$216,050	—	—	—	—	—
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	—	—	1st Pref.	6d.	6d.	1½	Nil
	La Guaira & Caracas	22½	June 1939	6,790	+	2,190	26	35,430	30,235	+	5,195	Stk.	8	6½	7½	Nil
	Leopoldina	1,918	1.7.39	22,005	-	511	26	490,617	481,216	+	9,401	Ord. Stk.	4	1	1	Nil
	Mexican	483	30.6.39	\$433,300	+	\$53,700	26	\$8,289,200	\$7,874,300	+	\$414,900	—	14	1½	1½	Nil
	Midland of Uruguay	319	May 1939	6,996	-	1,342	48	96,857	104,505	-	7,648	"	7½	1½	1½	Nil
	Nitrate	386	30.6.39	5,159	+	3,013	26	60,876	80,833	-	19,957	Ord. Sh.	52½	19½	15½	71½
	Paraguay Central	274	1.7.39	\$3,725,000	+	\$462,000	1	\$427,000	\$913,000	-	\$486,000	Pr. Li. Stk.	60	55½	40½	14½
	Peruvian Corporation	1,059	June 1939	59,567	-	7,164	52	785,648	946,133	-	160,485	Pref.	55½	15½	2	Nil
	Salvador	100	24.6.39	\$14,000	+	\$2,310	52	\$1,050,389	\$985,235	+	\$55,134	Pr. Li. Db.	23	20	19½	2
	San Paulo	153½	25.6.39	31,894	-	2,550	25	783,236	821,587	-	38,351	Ord. Stk.	64	28	23	81½
	Taltal	160	May 1939	2,020	+	200	48	31,245	36,805	-	5,560	Ord. Sh.	15½	1½	1½	10
	United of Havana	1,353	1.7.39	16,964	+	3,360	1	2,183	3,356	-	1,173	Ord. Stk.	35½	1½	1	Nil
Uruguay Northern	73	May 1939	810	-	65	48	10,629	10,359	+	270	Deb. Stk.	2	1	2	Nil	
Canada	Canadian National	23,762	21.6.39	694,162	+	72,834	24	16,572,980	15,673,057	+	899,923	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	—	—	4 p.c.	Perp. Dbs.	72	60	68½	51½
	Grand Trunk	—	—	—	—	—	—	—	—	—	4 p.c. Gar.	104	90	96½	4½	
India	Canadian Pacific	17,171	30.6.39	643,000	-	39,200	26	12,361,400	12,257,600	+	103,800	Ord. Stk.	87½	41½	41½	Nil
	Assam Bengal	1,329	10.6.39	37,935	-	327	10	270,437	262,869	+	7,568	Ord. Stk.	81½	70	71½	45½
	Barsi Light	202	10.6.39	2,812	-	285	10	22,357	27,937	-	5,580	Ord. Sh.	60½	54½	50½	51½
Various	Bengal & North Western ..	2,112	20.6.39	70,923	-	8,737	12	651,544	722,552	-	71,008	Ord. Stk.	311	278	280½	61½
	Bengal Doonars & Extension ..	161	20.6.39	3,848	-	384	12	23,126	28,854	-	5,728	"	89	83	91½	7½
	Bengal-Nagpur	3,272	20.6.39	210,000	+	11,056	12	1,815,322	1,681,457	+	133,863	"	95½	90	90½	47½
	Bombay, Baroda & Cl. India ..	3,085	30.6.39	211,950	-	12,900	13	2,319,675	2,370,450	-	50,775	"	1127½	95	104½	5½
	Madras & Southern Mahratta ..	2,967	10.6.39	170,025	+	6,558	10	1,251,359	1,197,391	+	53,968	"	108	97	103½	7½
	Rohilkund & Kumaon	571	20.6.39	14,829	-	876	12	130,824	149,995	-	19,171	"	308	285	286½	6½
	South Indian	2,531½	31.5.39	126,434	-	5,314	9	705,004	720,928	-	15,924	"	104	101	96½	5½
	Beira-Umtali	204	April 1939	73,498	-	—	31	550,072	—	—	—	—	—	—	—	—
Egyptian Delta	623	10.6.39	5,070	+	323	10	35,120	35,688	-	568	Pr. Sh.	7½	5½	1½	Nil	
Various	Kenya & Uganda	1,625	May 1939	206,557	-	11,295	21	1,220,870	1,309,332	-	88,462	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	—	B. Deb.	49	41	41	89½	
	Midland of W. Australia ..	277	May 1939	14,100	-	2,469	48	165,763	164,159	+	1,604	Inc. Deb.	935½	89	90½	47½
	Nigerian	1,900	20.5.39	24,674	-	16,769	8	222,258	238,421	-	16,163	—	—	—	—	—
	Rhodesia	2,442½	April 1939	340,448	-	—	31	2,514,398	—	—	—	—	—	—	—	—
	South Africa	13,284	17.6.39	664,776	+	50,583	12	7,105,582	6,682,520	+	423,062	—	—	—	—	—
Victoria	4,774	April 1939	796,751	-	81,321	43	7,865,959	8,228,216	-	362,257	—	—	—	—	—	

NOTE. Yields are based on the approximate current prices and are within a fraction of 1½

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being over estimated. The statements are based on the current rates of exchange and not on the par value